

ThinkServer TS100 Types 6431, 6432, 6433, and 6434



Hardware Maintenance Manual

ThinkServer TS100 Types 6431, 6432, 6433, and 6434



Hardware Maintenance Manual

Note: Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 251, and the *Warranty and Support Information* document on the *ThinkServer Documentation DVD*.

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安裝本产品之前，请仔细阅读 **Safety Information** (安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφαλείας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

Use the information in this section to help you identify potential unsafe conditions in an IBM® product that you are working on. Each Lenovo product, as it was designed and manufactured, has required safety items to protect users and service technicians from injury. The information in this section addresses only those items. Use good judgment to identify potential unsafe conditions that might be caused by non-Lenovo alterations or attachment of non-Lenovo features or options that are not addressed in this section. If you identify an unsafe condition, you must determine how serious the hazard is and whether you must correct the problem before you work on the product.

Consider the following conditions and the safety hazards that they present:

- Electrical hazards, especially primary power. Primary voltage on the frame can cause serious or fatal electrical shock.
- Explosive hazards, such as a damaged CRT face or a bulging or leaking capacitor.
- Mechanical hazards, such as loose or missing hardware.

To inspect the product for potential unsafe conditions, complete the following steps:

1. Make sure that the power is off and the power cord is disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cord:
 - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
 - Make sure that the power cord is the correct type, as specified in “Power cords” on page 51.
 - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-Lenovo alterations. Use good judgment as to the safety of any non-Lenovo alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe the following guidelines when you service electrical equipment:

- Check the area for electrical hazards such as moist floors, nongrounded power extension cords, and missing safety grounds.
- Use only approved tools and test equipment. Some hand tools have handles that are covered with a soft material that does not provide insulation from live electrical currents.
- Regularly inspect and maintain your electrical hand tools for safe operational condition. Do not use worn or broken tools or testers.
- Do not touch the reflective surface of a dental mirror to a live electrical circuit. The surface is conductive and can cause personal injury or equipment damage if it touches a live electrical circuit.
- Some rubber floor mats contain small conductive fibers to decrease electrostatic discharge. Do not use this type of mat to protect yourself from electrical shock.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Locate the emergency power-off (EPO) switch, disconnecting switch, or electrical outlet so that you can turn off the power quickly in the event of an electrical accident.
- Disconnect all power before you perform a mechanical inspection, work near power supplies, or remove or install main units.
- Before you work on the equipment, disconnect the power cord. If you cannot disconnect the power cord, have the customer power-off the wall box that supplies power to the equipment and lock the wall box in the off position.
- Never assume that power has been disconnected from a circuit. Check it to make sure that it has been disconnected.
- If you have to work on equipment that has exposed electrical circuits, observe the following precautions:
 - Make sure that another person who is familiar with the power-off controls is near you and is available to turn off the power if necessary.
 - When you are working with powered-on electrical equipment, use only one hand. Keep the other hand in your pocket or behind your back to avoid creating a complete circuit that could cause an electrical shock.
 - When you use a tester, set the controls correctly and use the approved probe leads and accessories for that tester.
 - Stand on a suitable rubber mat to insulate you from grounds such as metal floor strips and equipment frames.
- Use extreme care when you measure high voltages.
- To ensure proper grounding of components such as power supplies, pumps, blowers, fans, and motor generators, do not service these components outside of their normal operating locations.
- If an electrical accident occurs, use caution, turn off the power, and send another person to get medical aid.

Safety statements

Important:

Each caution and danger statement in this document is labeled with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *Safety Information* document.

For example, if a caution statement is labeled with “Statement 1”, translations for that caution statement are in the *Safety Information* document under “Statement 1”.

Be sure to read all caution and danger statements in this document before you perform the procedures. Read any additional safety information that comes with the server or optional device before you install the device.

Statement 1:



DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

Statement 2:



CAUTION:

When replacing the lithium battery, use only the battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

Statement 3:



CAUTION:

When laser products (such as CD drives, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.



DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.



Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

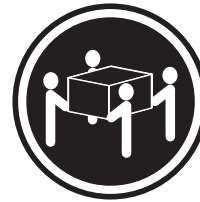
Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

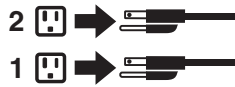
Use safe practices when lifting.

Statement 5:



CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



Statement 8:



CAUTION:

Never remove the cover on a power supply or any part that has the following label attached.



Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Statement 12:



CAUTION:

The following label indicates a hot surface nearby.



Statement 13:



DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

Statement 15:



CAUTION:

Make sure that the rack is secured properly to avoid tipping when the server unit is extended.

Chapter 1. Introduction

This *Hardware Maintenance Manual* contains information to help you solve problems that might occur in the Lenovo ThinkServer™ TS100 Machine Types 6431, 6432, 6433, and 6434 server. It describes the diagnostic tools that come with the server, error codes and suggested actions, and instructions for replacing failing components.

Replaceable components are of three types:

- **Self-service customer replaceable unit (CRU):** Replacement of self-service CRUs is your responsibility. If Lenovo installs a self-service CRU at your request, you will be charged for the installation.
- **Optional-service customer replaceable unit:** You may install an optional-service CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for the server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

Related documentation

In addition to this document, the following documentation also comes with the server:

- *Installation Guide*

This document is in Portable Document Format (PDF) is available on the *ThinkServer Documentation DVD*. It contains instructions for setting up the server and basic instructions for installing some optional devices.

- *User Guide*

This PDF is available on the *ThinkServer Documentation DVD*. It provides general information about the server, including information about features, and how to configure the server. It also contains detailed instructions for installing, removing, and connecting optional devices that the server supports.

- *Rack Installation Instructions*

This PDF is available on the *ThinkServer Documentation DVD*. It contains instructions for installing the server in a rack.

- *Safety Information*

This document is in PDF on the *ThinkServer Documentation DVD*. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.

- *Warranty and Support Information*

This document is in PDF on the *ThinkServer Documentation DVD*. It contains information about the terms of the warranty and getting service and assistance.

Depending on the server model, additional documentation might be included on the *ThinkServer Documentation DVD*.

The server might have features that are not described in the documentation that comes with the server. The documentation might be updated occasionally to include

information about those features, or technical updates might be available to provide additional information that is not included in the server documentation. These updates are available from the Lenovo Web site. To check for updated documentation and technical updates, complete the following steps.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to: <http://www.lenovo.com/support>.
2. Enter your product number (machine type and model number) or select **Servers** from the **Select your product** list.
3. Select **Servers** from the **Brand** list.
4. From **Family** list, select **ThinkServer TS100**, and click **Continue**.
5. Click **Downloads and drivers** to download firmware updates.

Notices and statements in this document

The caution and danger statements that appear in this document are also in the multilingual *Safety Information* document, which is on the *ThinkServer Documentation DVD*. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage might occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Features and specifications

The following information is a summary of the features and specifications of the server. Depending on the server model, some features might not be available, or some specifications might not apply.

Table 1. Features and specifications

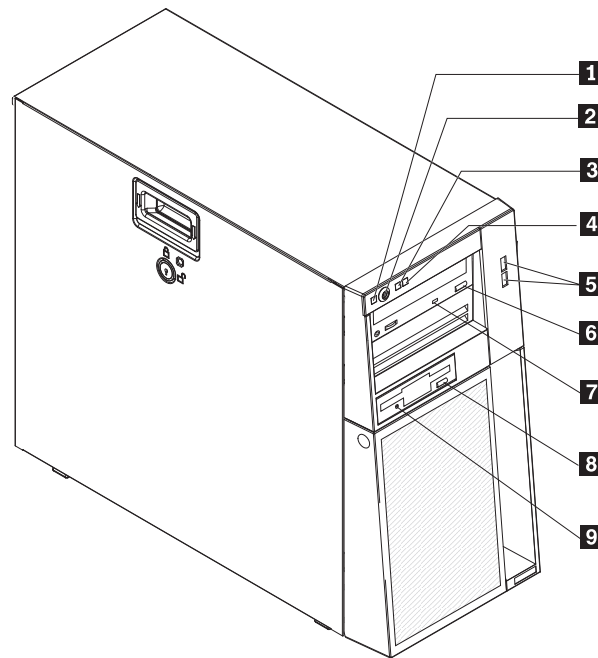
<p>Microprocessor:</p> <ul style="list-style-type: none"> Supports one Intel® Core™ 2 Duo dual-core or Xeon® dual-core or quad-core microprocessor <p>Note: Intel Virtualization Technology (VT) is not available on the Core 2 Duo E4600; however, these microprocessors can only run paravirtualization.</p> <ul style="list-style-type: none"> 2 MB, 6 MB, or 12 MB Level-2 cache 800, 1066, or 1333 MHz front-side bus (FSB) <p>Memory:</p> <ul style="list-style-type: none"> Minimum: 512 MB Maximum: 8 GB Types: PC2-5300 or PC2-6400, ECC unbuffered double-data-rate 2 (DDR2) 667 or 800 MHz SDRAM Connectors: four dual inline memory module (DIMM) connectors, two-way interleaved <p>Drives (depending on the model):</p> <ul style="list-style-type: none"> Diskette (optional): External or internal USB FDD drive and memory key Hard disk drive: Hot-swap SAS, hot-swap SATA, or simple-swap SATA One of the following SATA attached optical drives: <ul style="list-style-type: none"> DVD-ROM Multiburner (optional) <p>Drive bays (depending on the model):</p> <ul style="list-style-type: none"> Two 5.25 in. half-high bays (one optical drive installed) One 3.5 in. slim-high removable-media drive bay (optional diskette drive) Four 3.5 in. or 2.5 in. slim-high hard disk drive bays (some models) Eight 2.5 in. slim-high hard disk drive bays (some models) <p>PCI expansion slots (depending on the model):</p> <ul style="list-style-type: none"> One PCI Express x8 slot One PCI Express x4 slot (x4 slot with x1 electrical) One PCI-X 64-bit/133 MHz slot <p>Note: This PCI-X slot is enabled when an optional PCI-X enablement card is installed in the mini-PCI slot on the system board. When no mini-PCI-X enablement card installed, this slot has no function.</p> <ul style="list-style-type: none"> Two PCI 32-bit/33 MHz slots 	<p>Fans:</p> <p>Three speed-controlled fans.</p> <p>Power supply:</p> <p>One of the following power supplies:</p> <ul style="list-style-type: none"> One or two redundant 430-watt (90-240 V ac) One non-redundant 401-watt (90-240 V ac) <p>Size:</p> <ul style="list-style-type: none"> Height: 438 mm (17.25 in.) Depth: 540 mm (21.25 in.) Width: 216 mm (8.5 in.) Weight: 16.3 kg (36 lb) to 25.2 kg (56 lb) depending upon configuration <p>Integrated functions:</p> <ul style="list-style-type: none"> Mini-baseboard management controller (mini-BMC) Broadcom BCM5722 10/100/1000 Ethernet controller on the system board with RJ-45 Ethernet port One internal single-channel (four ports per channel) SAS/SATA controller (mini-PCI slot) Two serial ports One parallel port Six-port Serial ATA controller Eight Universal Serial Bus (USB) v2.0 ports (two on front and four on rear, one internal for optional tape drive, and one internal for optional Remote Supervisor Adapter II SlimLine) Onboard ATI ES1000 video controller <ul style="list-style-type: none"> Compatible with SVGA and VGA 16 MB DDR2 SDRAM video memory <p>Diagnostic LEDs:</p> <ul style="list-style-type: none"> Fans Hard disk drives Memory Microprocessor PCI slots Power supply VRD <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> Sound power, idling: 5.0 bel Sound power, operating: 5.3 bel 	<p>Environment:</p> <ul style="list-style-type: none"> Air temperature: <ul style="list-style-type: none"> Server on: 10° to 35°C (50° to 95°F) Altitude: 0 to 914.4 m (3000 ft) Server on: 10° to 32°C (50° to 89.6°F) Altitude: 914.4 m (3000 ft) to 2133.6 m (7000 ft) Server off: 10° to 43°C (50° to 109.4°F) Maximum altitude: 2133.6 m (7000 ft) Shipping: -40° to 60°C (-40° to 140°F) Humidity (operating and storage): <ul style="list-style-type: none"> Server on: 8% to 80% Server off: 8% to 80% <p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour:</p> <ul style="list-style-type: none"> Minimum configuration: 630 Btu per hour (185 watts) Maximum configuration: 1784 Btu per hour (523 watts) <p>Electrical input:</p> <ul style="list-style-type: none"> Sine-wave input (50 or 60 Hz) required Input voltage and frequency ranges automatically selected Input voltage low range: <ul style="list-style-type: none"> Minimum: 100 V ac Maximum: 127 V ac Input voltage high range: <ul style="list-style-type: none"> Minimum: 200 V ac Maximum: 240 V ac Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> Minimum: 0.20 kVA (all models) Maximum: 0.55 kVA <p>Notes:</p> <ol style="list-style-type: none"> Power consumption and heat output vary depending on the number and type of optional features that are installed and the power-management optional features that are in use. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average stated values because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.
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Server controls, LEDs, and power

This section describes the controls and light-emitting diodes (LEDs) and how to turn the server on and off.

Front view

The following illustration shows the controls, LEDs, and connectors on the front of the server.



- | | | | |
|----------|------------------------------|----------|--------------------------------------|
| 1 | Power-on LED | 6 | CD-eject or DVD-eject button |
| 2 | Power-control button | 7 | CD or DVD drive activity LED |
| 3 | Hard disk drive activity LED | 8 | Optional diskette-eject button |
| 4 | System-error LED | 9 | Optional diskette drive activity LED |
| 5 | USB connectors | | |

Power-on LED

When this LED is lit and not flashing, it indicates that the server is turned on. When this LED is flashing, it indicates that the server is turned off and still connected to an ac power source. When this LED is off, it indicates that ac power is not present, or the power supply or the LED itself has failed. A power LED is also on the rear of the server.

Note: If this LED is off, it does not mean that there is no electrical power in the server. The LED might be burned out. To remove all electrical power from the server, you must disconnect the power cords from the electrical outlets.

Power-control button

Press this button to turn the server on and off manually.

Hard disk drive activity LED

When this LED is flashing, it indicates that the associated hard disk drive is in use.

USB connectors

Connect USB devices to these connectors.

CD-eject or DVD-eject button

Press this button to release a CD from the CD drive or a DVD from the DVD drive.

CD or DVD drive activity LED

When this LED is lit, it indicates that the CD drive or DVD drive is in use.

(Optional) diskette-eject button

Press this button to release a diskette from the diskette drive.

(Optional) diskette drive activity LED

When this LED is lit, it indicates that the diskette drive is in use.

Hot-swap hard disk drive activity LED (some models)

On some server models, each hot-swap drive has a hard disk drive activity LED. When this green LED is flashing, it indicates that the associated hard disk drive is in use.

When the drive is removed, this LED also is visible on the hard disk drive backplane, next to the drive connector. The backplane is the printed circuit board behind drive bays 4 through 7 (or bays 4 through 11 on some 2.5-inch hard disk drive SAS models).

Hot-swap hard disk drive status LED (some models)

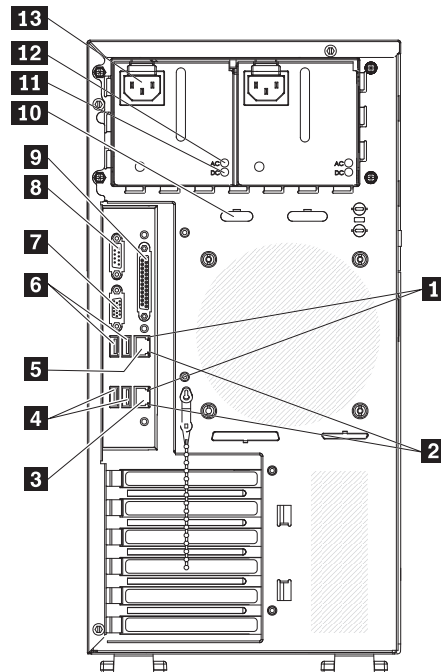
On some server models, each hot-swap hard disk drive has an amber status LED. If this amber status LED for a drive is lit, it indicates that the associated hard disk drive has failed.

If an optional IBM ServeRAID controller is installed in the server and the LED flashes slowly (one flash per second), it indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.

When the drive is removed, this LED also is visible on the hard disk drive backplane, below the hot-swap hard disk drive activity LED.

Rear view

The following illustration shows the connectors and LEDs on the rear of the server.



- | | | | |
|----------|--|-----------|---------------------------|
| 1 | Ethernet transmit/ receive activity LED (amber) | 8 | Serial 1 (Com1) connector |
| 2 | Ethernet link status LED (green) | 9 | Parallel connector |
| 3 | Remote Supervisor Adapter II SlimLine (Ethernet) connector | 10 | Serial 2 (Com2) connector |
| 4 | USB connectors 1 and 2 | 11 | DC power LED |
| 5 | Ethernet connector | 12 | AC power LED |
| 6 | USB connectors 3 and 4 | 13 | Power cord connector |
| 7 | Video connector | | |

Power-cord connector

Connect the power cord to this connector.

AC power LED

On some server models, each hot-swap power supply has an ac power LED and a dc power LED. During typical operation, both the ac and dc power LEDs are lit.

DC power LED

On some server models, each hot-swap power supply has a dc power LED and an ac power LED. During typical operation, both the ac and dc power LEDs are lit.

Serial 2 connector

Connect a 9-pin serial device to this connector.

Parallel connector

Connect a parallel device to this connector.

Serial 1 connector

Connect a 9-pin serial device to this connector.

Video connector

Connect a monitor to this connector.

USB connectors

Connect USB devices to these connectors.

Ethernet connector

Use this connector to connect the server to a network.

Ethernet transmit/receive activity LED

This LED is on the Ethernet connector on the rear of the server. When this LED is lit, it indicates that there is activity between the server and the network.

Ethernet link status LED

This LED is on the Ethernet connector on the rear of the server. When this LED is lit, it indicates that there is an active connection on the Ethernet port.

Remote Supervisor Adapter II SlimLine/Ethernet connector

Use this connector to connect the Remote Supervisor Adapter II SlimLine to a network.

Server power features

When the server is connected to an ac power source but is not turned on, the operating system does not run, and all core logic except the service processor is shut down; however, the server can respond to requests from the service processor, such as a remote request to turn on the server. The power-on LED flashes to indicate that the server is connected to ac power but not turned on.

Turning on the server

Approximately 20 seconds after the server is connected to ac power, the power-control button becomes active, and one or more fans might start running to provide cooling while the server is connected to power. You can turn on the server and start the operating system by pressing the power-control button.

The server can also be turned on in any of the following ways:

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If your operating system supports the systems-management software for an optional Remote Supervisor Adapter II SlimLine, the systems-management software can turn on the server.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.
- If an optional Remote Supervisor Adapter II SlimLine is installed in the server, the server can be turned on from the Remote Supervisor Adapter II SlimLine user interface.

Note: When 4 GB or more of memory (physical or logical) is installed, some memory is reserved for various system resources and is unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI optional devices.

Turning off the server

When you turn off the server and leave it connected to ac power, the server can respond to requests from the service processor, such as a remote request to turn

on the server. While the server remains connected to ac power, one or more fans might continue to run. To remove all power from the server, you must disconnect it from the power source.

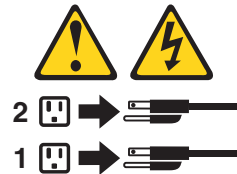
Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

Statement 5:



CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



The server can be turned off in any of the following ways:

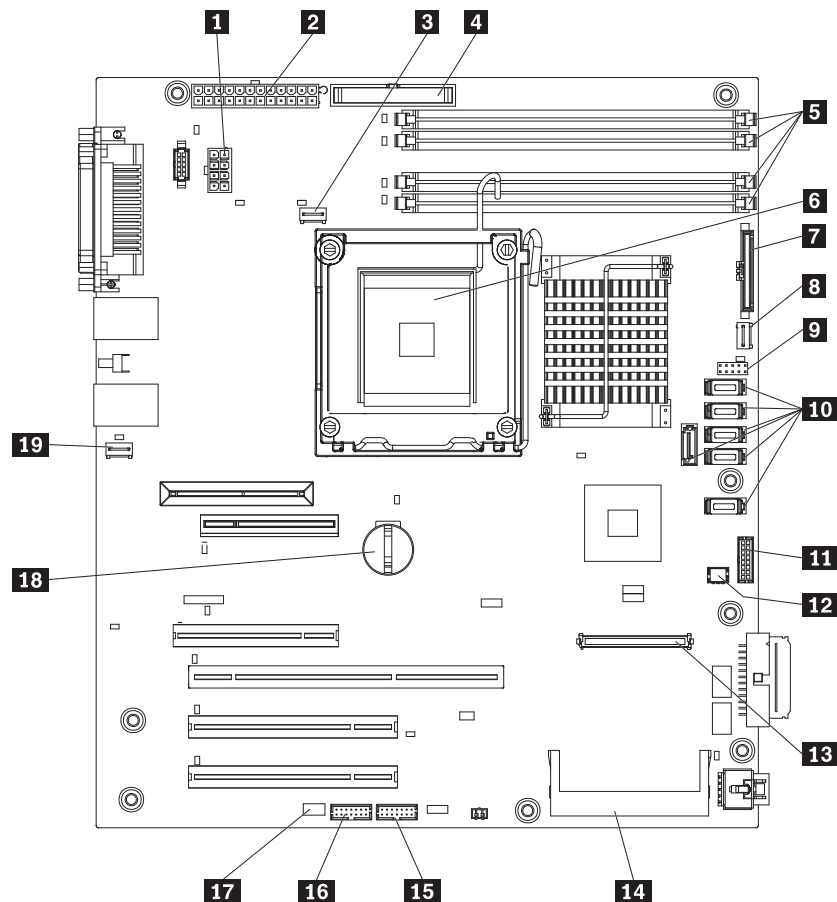
- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- If an optional Remote Supervisor Adapter II SlimLine is installed in the server, the server can be turned off from the Remote Supervisor Adapter II SlimLine user interface.
- If the Wake on LAN feature turned on the server, the Wake on LAN feature can turn off the server.
- The server can turn itself off as an automatic response to a critical system failure.

Connectors, LEDs, and jumpers

The illustrations in this section show the connectors, light-emitting diodes (LEDs), and jumpers on the system board. The illustrations might differ slightly from your hardware.

System board internal connectors

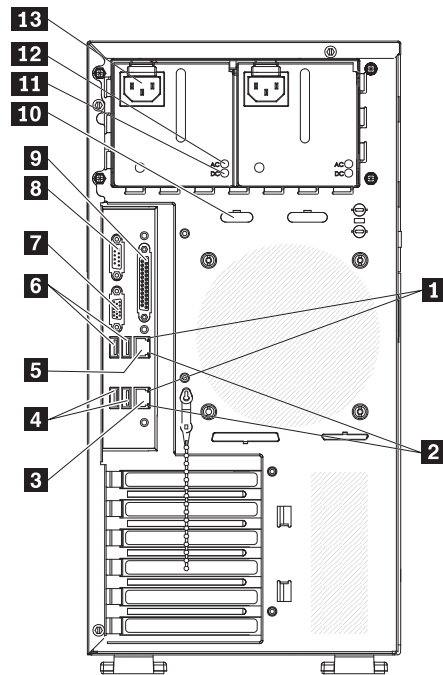
The following illustration shows the internal connectors on the system board.



- | | | | |
|-----------|--|-----------|---|
| 1 | Microprocessor power connector | 11 | Hot-swap hard disk drive backplanar connector |
| 2 | Main power connector | 12 | USB tape drive connector |
| 3 | Microprocessor fan connector | 13 | PCI-X enablement card connector |
| 4 | (optional) External USB diskette drive connector | 14 | Mini-PCI slot |
| 5 | DIMM connectors | 15 | Mini-BMC JTAG connector |
| 6 | Microprocessor connector | 16 | Mini-BMC boot loader |
| 7 | Front panel | 17 | Wake on LAN |
| 8 | Hard disk drive fan connector | 18 | Battery |
| 9 | Front USB connectors | 19 | System fan connector |
| 10 | SATA connector | | |

System board external connectors

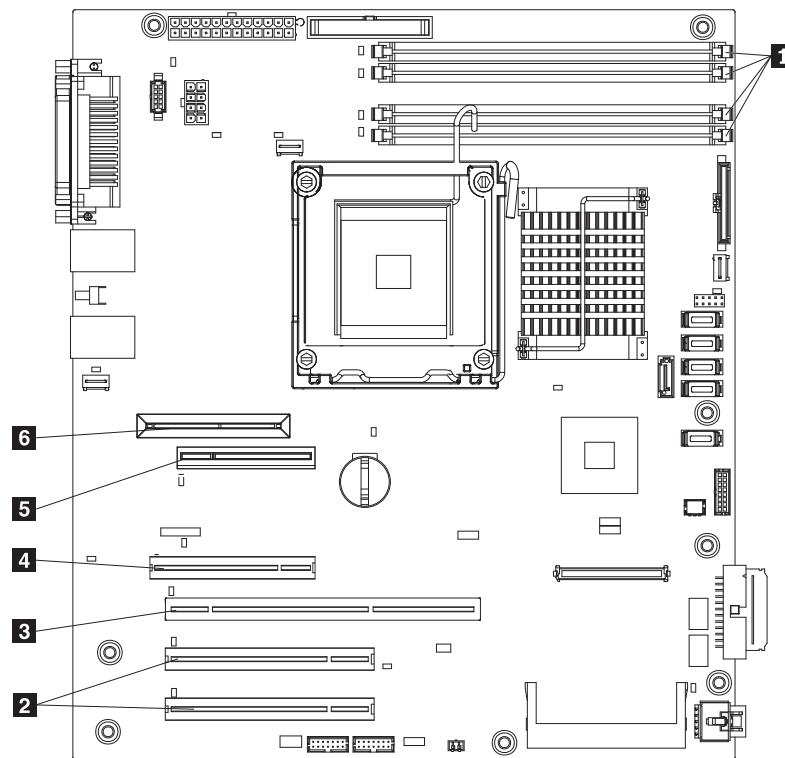
The following illustration shows the external input/output (I/O) connectors on the system board.



- | | | | |
|----------|--|-----------|---------------------------|
| 1 | Ethernet transmit/ receive activity LED (amber) | 8 | Serial 1 (Com1) connector |
| 2 | Ethernet link status LED (green) | 9 | Parallel connector |
| 3 | Remote Supervisor Adapter II SlimLine (Ethernet) connector | 10 | Serial 2 (Com2) connector |
| 4 | USB connectors 1 and 2 | 11 | DC power LED |
| 5 | Ethernet connector | 12 | AC power LED |
| 6 | USB connectors 3 and 4 | 13 | Power cord connector |
| 7 | Video connector | | |

System board optional-devices connectors

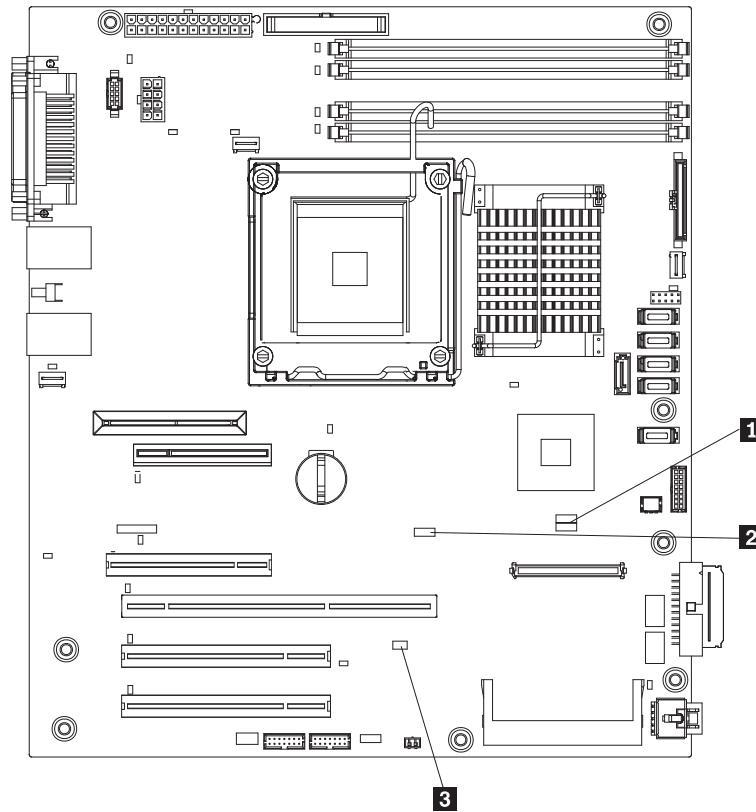
The following illustration shows the system board connectors for user-installable optional devices.



- | | | | |
|----------|--------------------------------|----------|--|
| 1 | DIMM connectors | 4 | PCI Express x4 (x1) connector |
| 2 | PCI 32-bit 33 MHz connector | 5 | PCI Express x8 connector |
| 3 | PCI-X 64-bit 133 MHz connector | 6 | Remote Supervisor Adapter II Slim Line connector |

System board LEDs

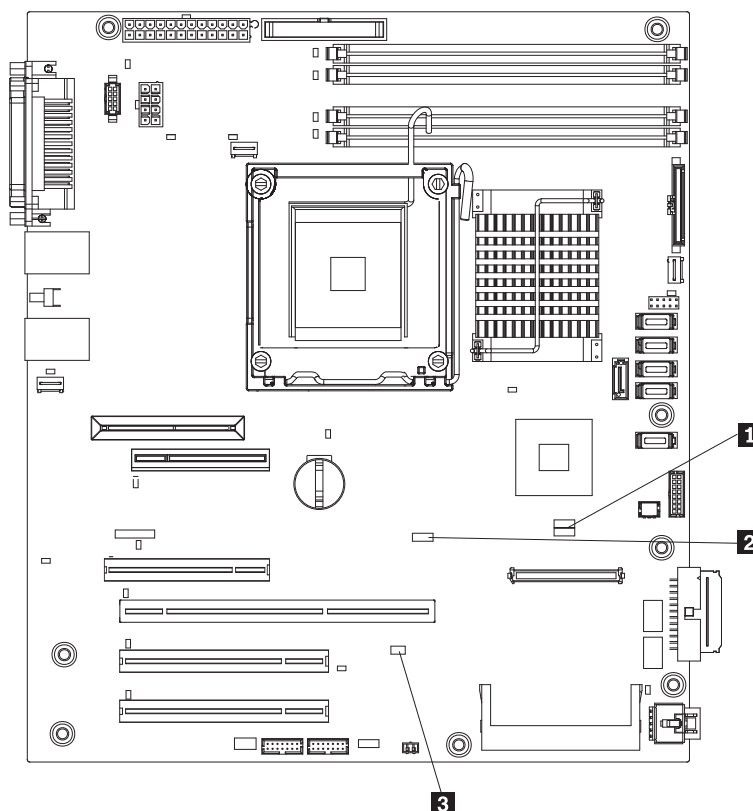
The following illustration shows the LEDs on the system board.



- 1** Boot block jumper (JP6)
- 2** Clear CMOS jumper (JP1)
- 3** Mini-BMC force update jumper (JP3)

System board jumpers

The following illustration shows the jumpers on the system board.



- 1** Boot block jumper (JP6)
- 2** Clear CMOS jumper (JP1)
- 3** Mini-BMC force update jumper (JP3)

The following table describes the function of each jumper block.

Table 2. System board jumper blocks

Jumper number	Jumper name	Jumper setting
JP1	Clear CMOS jumper	<ul style="list-style-type: none"> Pins 1 and 2: Keep CMOS data (default) Pins 2 and 3: Clear the CMOS data, which clears the power-on password. Make sure that the ac power source is disconnected from the server. <p>Note: Changing the position of this jumper does not affect the administrator password check if an administrator password is set. If the administrator password is set and forgotten, remove and then reinstall the battery.</p>
JP3	Mini-BMC force update	<p>Pins 1 and 2: Open (default).</p> <p>Note: You do not need to set this jumper because it stays at this setting.</p>

Table 2. System board jumper blocks (continued)

Jumper number	Jumper name	Jumper setting
JP6	Boot block jumper (JP6)	<ul style="list-style-type: none"> • Pins 1 and 2: Normal (default) • Pins 2 and 3: Recover boot block (see “Updating (flash-update) the BIOS code on the server” on page 232)

Chapter 2. Configuration information and instructions

The firmware for the server is periodically updated and is available for download from the Web. This chapter provides information about updating the firmware and using the configuration utilities.

Updating the firmware

The firmware for the server is periodically updated and is available for download on the Web. To check for the latest level of firmware, such as BIOS code, vital product data (VPD) code, device drivers, and service processor firmware, use the ThinkServer EasyUpdate program or go to: <http://www.lenovo.com/support>. Download the latest firmware for the server; then, install the firmware, using the instructions that are included with the downloaded files.

When you replace a device in the server, you might have to either update the server with the latest version of the firmware that is stored in memory on the device or restore the pre-existing firmware from a diskette or CD image.

The following items are downloadable from the Web at: <http://www.ibm.com/systems/support/>:

- BIOS code
- Diagnostics programs
- Mini-BMC firmware
- Ethernet firmware
- ServeRAID™ firmware
- SAS/SATA firmware

Major components contain VPD code. You can select to update the VPD code when you update the BIOS code.

Configuring the server

The following configuration programs are available to configure the server:

- **Configuration/Setup Utility program**

The Configuration/Setup Utility program is part of the basic input/output system (BIOS) code. You can use this program to configure serial port assignments, change interrupt request (IRQ) settings, change the device startup sequence, set the date and time, and set passwords. For information about using this program, see “Using the Configuration/Setup Utility program” on page 19.

- **EasyManage software**

ThinkServer EasyManage software helps you maintain high performance while limiting downtime. Through a single console you can monitor and configure alerts for security and performance, perform Hardware Failure Prediction, deploy operating systems and software, and monitor software licenses. You can download and install the EasyManage software from the Lenovo Support Web site (<http://www.lenovo.com/support>). Optionally, you can order an EasyManage installation disc from your Lenovo marketing representative or reseller.

- *ThinkServer EasyStartup DVD*

The Lenovo *ThinkServer EasyStartup DVD* that comes with the server provides programs to help you set up the server and install an operating system. The

EasyStartup program detects installed hardware devices and guides you through the process of creating a response file and performing an unattended installation of the operating system and associated device drivers.

For more information about the *ThinkServer EasyStartup DVD*, see “Using the *ThinkServer EasyStartup DVD*” on page 23.

- **ThinkServer EasyUpdate program**

The ThinkServer EasyUpdate program allows you to download and install updates for your specific server or server systems. Updates can be device drivers, BIOS and firmware updates, or software updates.

- **Mini-baseboard management controller utility programs**

Use these programs to configure the mini-baseboard management controller, to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data, and to remotely manage a network. For information about using these programs, see “Using the mini-baseboard management controller utility programs” on page 26.

- **Boot Menu program**

The Boot Menu program is part of the BIOS code. Use it to override the startup sequence that is set in the Configuration/Setup Utility program and temporarily assign a device to be first in the startup sequence. For information about using this program, see “Using the Boot Menu program” on page 29.

- **Broadcom NetXtreme Gigabit Ethernet Boot Agent**

The Broadcom NetXtreme Gigabit Ethernet Boot Agent is part of the BIOS. You can use it to configure the network as a startable device, and you can customize where the network startup optional devices occur in the startup sequence. Enable and disable the Broadcom NetXtreme Gigabit Ethernet Boot Agent from the Configuration/Setup Utility program. For information, see “Enabling the Broadcom NetXtreme Gigabit Ethernet Boot Agent” on page 30.

- **Broadcom NetXtreme Gigabit Ethernet controller configuration**

To configure the integrated Gigabit Ethernet controller, see “Configuring the Broadcom NetXtreme Gigabit Ethernet controller” on page 30.

- **LSI Configuration Utility program**

Use the LSI Configuration Utility program to configure the integrated SAS/SATA controller with RAID capabilities and the devices that are attached to it. For information about using this program, see “LSI Configuration Utility program” on page 30.

The following table lists the different server configurations and the applications that are available for configuring and managing RAID arrays.

Server configuration	RAID array configuration (before operating system is installed)	RAID array management (after operating system is installed)
Integrated SATA and no SAS controller card installed	None	None
SAS/SATA controller card (LSI 1064e) installed	LSI Utility (BIOS Utility Ctrl+C)	MyStorage (for monitoring storage only)
ServeRAID-MR10i adapter installed	ServeRAID Manager Hardware Boot CD, BIOS Utility (Ctrl+A)	ServeRAID Manager, ARCCONF (CLI)

- **Remote Supervisor Adapter II SlimLine configuration**

For information about setting up and cabling a Remote Supervisor Adapter II SlimLine for use in an Advanced System Management (ASM) network, see “Setting up a Remote Supervisor Adapter II SlimLine” on page 32.

Using the Configuration/Setup Utility program

This section provides instructions for starting the Configuration/Setup Utility program and descriptions of the menu choices that are available.

Starting the Configuration/Setup Utility program

To start the Configuration/Setup Utility program, complete the following steps:

1. Turn on the server. If the server is already on when you start this procedure, you must shut down the operating system, turn off the server, wait a few seconds until all in-use LEDs are turned off, and restart the server.
2. When the message Press F1 for Configuration/Setup, Press F12 for Boot Menu is displayed, press F1. (This prompt is displayed on the screen for only a few seconds. You must press F1 quickly.) If you have set both a power-on password and an administrator password, you must type the administrator password to access the full Configuration/Setup Utility menu. If you do not type the administrator password, a limited Configuration/Setup Utility menu is available.
3. Follow the instructions on the screen.

Configuration/Setup Utility menu choices

The following choices are on the Configuration/Setup Utility main menu. Depending on the version of the BIOS code, some menu choices might differ slightly from these descriptions.

Note: When you use the server for the first time, you might want to use the Configuration/Setup Utility menu choice **Load Default Settings** to reset the Configuration/Setup Utility menu choices to the factory default settings, in case they were changed before you received the server. Otherwise, some choices might not be displayed in the menu.

- **System Summary**

Select this choice to view configuration information, including the amount of installed memory. When you make configuration changes through other choices in the Configuration/Setup Utility program, the changes are reflected in the system summary; you cannot change settings directly in the system summary.

This choice is on the full and limited Configuration/Setup Utility menu.

- **Processor Summary**

Select this choice to view the processor information, including the type, speed, and cache size of the microprocessor.

- **System Information**

Select this choice to view information about the server. When you make changes through other choices in the Configuration/Setup Utility program, some of those changes are reflected in the system information; you cannot change settings directly in the system information.

This choice is on the full Configuration/Setup Utility menu only.

- **Devices and I/O Ports**

Select this choice to view or change device assignments and input/output (I/O) ports. Select this choice to enable or disable the integrated SAS/SATA controller and Ethernet controller, and standard connectors (such as serial and parallel).

Enable is the default setting for all controllers. If you disable a device, it cannot

be configured, and the operating system will not be able to detect it (this is equivalent to disconnecting the device). If you disable the integrated SAS/SATA controller and no SAS/SATA adapter is installed, the server will have no SAS/SATA capability. If you disable the integrated Ethernet controller and no Ethernet adapter is installed, the server will have no Ethernet capability.

This choice is on the full Configuration/Setup Utility menu only.

- **Serial Port 1**

Select this choice to set up serial port 1.

- **Serial Port 2**

Select this choice to set up serial port 2.

- **Parallel Port Setup**

Select this choice to set up the parallel port and to adjust the parallel port resources and features.

- **Remote Console Redirection**

Select this choice to enable and configure serial remote video and keyboard redirection.

- **Internal Floppy Support**

Select this choice to disable or enable the diskette drive.

- **SATA Programming Interface**

Select this choice to disable, enable, or configure the Serial ATA.

To comply with the 4690 OS requirement, this option provides a **Legacy Only (4690)** mode that you can select from the menu. When you select the **Legacy Only (4690)** mode, this enables the SATA 0 through SATA 3 ports for the 4690 OS.

- **Planar Ethernet**

Select this choice to disable or enable the Ethernet on the system board.

- **USB Support**

Select this choice to enable or disable the USB support.

- **Video**

Select this choice to view the video information.

- **System MAC Addresses**

Select this choice to view the MAC addresses for network devices that are installed in the server.

- **Date and Time**

Select this choice to set the date and time in the server, in 24-hour format (*hour:minute:second*).

This choice is on the Configuration/Setup Utility menu only.

- **System Security**

Select this choice to set passwords. See “Using passwords” on page 23 for more information about passwords.

- **Administrator Password**

This choice is on the full Configuration/Setup Utility menu only.

Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full Configuration/Setup Utility menu. If an administrator password is set, the full Configuration/Setup Utility menu is available only if you type the administrator password at the password prompt.

- **Power-on Password**

Select this choice to set, change, or delete a power-on password.

- **Start Options**

Select this choice to view or change the startup options. Changes in the start options take effect when you restart the server.

You can set keyboard operating characteristics, such as the keyboard speed, and you can specify whether the server starts with the keyboard number lock on or off.

You can enable or disable the hard disk drive self-monitoring, analysis, and reporting technology (SMART) function.

You can enable a virus-detecting test that checks for changes in the boot record when the server starts.

- **Startup Sequence Options**

Select this choice to view the **Startup Sequence Options** menu. The startup sequence specifies the order in which the server checks devices to find a boot record. The server starts from the first boot record that it finds.

- **Advanced Setup**

Select this choice to change values for advanced hardware features, such as CPU options and PCI configuration.

Important: The server might malfunction if these settings are incorrectly configured. Follow the instructions on the screen carefully.

This choice is on the full Configuration/Setup Utility menu only.

- **CPU Options**

Select this choice to view or change the options that control the behavior of the CPU.

- **PCI Bus Control**

Select this choice to view or change the system resources that are used by the installed PCI or PCI-Express devices.

- **RSA II Settings**

This choice is displayed only when a Remote Supervisor Adapter II SlimLine is installed in the server.

Select this choice to view the DHCP IP address and settings and the Remote Supervisor Adapter II SlimLine MAC address; to view or change the DHCP control, static IP address, operating-system USB selections; and to save the values and reboot the Remote Supervisor Adapter II SlimLine.

- **Baseboard Management Controller (BMC) Setting**

Select this choice to change the Intelligent Platform Management Interface (IPMI) settings for the mini-BMC controller.

- **IPMI Specification Version**

This nonselectable item displays the IPMI specification version.

- **BMC Firmware Version**

This nonselectable item displays the mini-BMC firmware version.

- **BMC Build Date**

This nonselectable item displays the date that the mini-BMC code was built.

- **BMC Build Level**

This nonselectable item displays the version of the mini-BMC code.

- **Existing Event Log number**

This nonselectable item displays the number of entries in the system-event log.

- **BMC POST Watchdog**

This option enables or disables the POST watchdog. **Disabled** is the default setting.

- **BMC POST Watchdog Timeout**

This option enables or disables the mini-BMC POST watchdog timer.

- **System - BMC Serial Port Sharing**

Select this choice to specify whether the serial port that the mini-BMC uses is shared with the other system components or is dedicated to the mini-BMC. When this option is enabled, the mini-BMC controls the serial port by way of remote commands. If this option is disabled, the serial port is assigned to the mini-BMC, unless the **BMC Serial Port Access Mode** option is set to disabled.

- **BMC Serial Port Access Mode**

Select this choice to set the mini-BMC access mode for the system serial port. **Shared** is the default setting. You can choose from the following access modes:

- Shared**

- The serial port is available for use by POST and the operating system, however, the mini-BMC can still monitor the serial data for a take-control sequence.

- Pre-Boot**

- The mini-BMC has control of the serial port before the operating system is booted, however, after the operating system is booted, the mini-BMC will not have access to the serial port until you turn off the server or reset the settings.

- Dedicated**

- The mini-BMC has complete control of the serial port. POST and the operating system will not be allowed to use the serial port.

- Disabled**

- The mini-BMC has access to the serial port.

- **Reboot System on NMI**

This option sets the mini-BMC timer to automatically reboot the server after an NMI occurs. **Enabled** is the default setting.

- **User Account Settings**

Select this choice to view the user account settings for the mini-BMC.

- **BMC Network Configuration**

Select this choice to configure specific network settings for the mini-BMC.

- **BMC System Event Log**

Select this choice to view the mini-BMC system-event log, which contains all system-error messages that have been generated. Use the arrow keys to move among pages in the log. Run the diagnostic programs to get more information about the error codes. Select Clear BMC System Event Log to clear the mini-BMC system-event logs.

- **Event/Error Logs**

Select this choice to view or clear error logs.

- **System Event/Error Log**

- Select this choice to view the system-event and error messages that the system generated during POST and run time. by the SMI handler and by the service processor. The most recent event or error is displayed first. Use the

Down Arrow key to view the older entries, and use the Up Arrow key to view the newer entries. Select **Clear system logs** and press Enter to erase the system event/error log.

- **Save Settings**

Select this choice to save the changes that you have made in the settings.

- **Restore Settings**

Select this choice to cancel the changes that you have made in the settings and restore the previous settings.

- **Load Default Settings**

Select this choice to cancel the changes that you have made in the settings and restore the factory settings.

- **Exit Setup**

Select this choice to exit from the Configuration/Setup Utility program. If you have not saved the changes that you have made in the settings, you are asked whether you want to save the changes or exit without saving them.

Using passwords

You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) for the power-on (user) password or the administrator password.

If you set a power-on password and an administrator password, you can type either password at the password prompt that is displayed as you start the computer. However, if you want to change the settings in the Configuration/Setup Utility program, you must type the administrator password to access the full Configuration/Setup Utility menu. If you type the power-on password, you have access to only the limited Configuration/Setup Utility menu.

Keep a record of the password in a secure place. If you forget the power-on password or administrator password, you can regain access to the computer through one of the following methods:

- If you have forgotten the power-on password and an administrator password is set, type the administrator password at the power-on prompt. Start the Configuration/Setup Utility program and change the power-on password.
- Remove the battery and then install the battery.

Using the *ThinkServer EasyStartup DVD*

The *ThinkServer EasyStartup DVD* contains a setup and installation program designed for your server. The program works in conjunction with your operating-system installation disc to simplify and automate the process of installing the operating system and device drivers.

If you did not receive a *ThinkServer EasyStartup DVD* with your server, you can download an image from the Lenovo Support Web site at <http://www.lenovo.com/support>.

The EasyStartup program has the following features:

- Self-booting DVD
- Easy-to-use, language-selectable interface
- Integrated help system
- Automatic hardware detection
- Device drivers provided based on the server model and detected devices
- Selectable partition size and file system

- Support for multiple operating systems
- Installs the operating system and device drivers in an unattended mode to save time
- Creates a reusable response file that can be used with similarly configured Lenovo servers to make future installations even faster.

Before you use the *ThinkServer EasyStartup DVD*

Functionality and supported operating systems can vary with different versions of the EasyStartup program. To learn more about the version you have, do the following:

1. Insert the *ThinkServer EasyStartup DVD* and restart the server.
2. Advance to the Home screen.
3. Click **Release notes**. The release notes feature provides detailed information about the operating systems and server configurations supported by that version of the EasyStartup program.
4. Click **User Guide**. The User Guide provides an overview of the various functions provided by that version of the EasyStartup program.

Before using the EasyStartup program to install an operating system, if you intend to use a RAID configuration, make sure that your storage controller is configured for the RAID level and functionality that you want to use. Also, make sure any external storage devices and fiber channels are configured correctly.

For models that use the LSI storage controller: If you are using the SAS/SATA storage controller that is integrated into the system board, you can use the LSI Configuration Utility provided in BIOS to configure your RAID settings. To access the LSI Configuration Utility, do the following:

1. Start the server and watch the monitor carefully.
2. When <<< Press <CTRL><C> to start LSI Configuration Utility >>> is displayed, press Ctrl+C.

For additional information about using this utility, see “LSI Configuration Utility program” on page 30.

For models that use the Adaptec HostRAID storage controller (RAID 8e): If you are using the Adaptec HostRAID (ServeRAID 8e) storage controller that is integrated into the system board, you can use the utility programs provided on the ServeRAID CD provided with your server to configure your RAID settings. Alternatively, you can use the Adaptec RAID Configuration Utility provided in BIOS. To access the Adaptec RAID Configuration Utility, do the following:

1. Start the server and watch the monitor carefully.
2. When <<< Press <CTRL><A> to start the Adaptec RAID Configuration Utility >>> is displayed, press Ctrl+A.

If you are using a ServeRAID adapter, use the configuration utilities provided on the ServeRAID CD to configure your RAID settings. If you are using any storage devices or fiber channels, use the utilities provided with the device.

EasyStartup overview

The EasyStartup program requires a supported Lenovo server with an enabled, startable (bootable) DVD drive. In addition to the *ThinkServer EasyStartup DVD*, you also must have the operating-system installation CD or DVD and the product key for the operating system (if provided).

The EasyStartup program performs the following tasks:

- Sets the system date and time
- Detects installed hardware devices
- Guides the network administrator through the process of creating a response file
- Prepares the hard disk for installation
- Prompts the network administrator to insert the operating-system installation disc
- Initiates an unattended installation of the operating system and device drivers for most adapters and devices

Setup and configuration: When you start the *ThinkServer EasyStartup DVD*, you will be prompted for the following:

- Select the language in which you want to view the program.
- Select the language of the keyboard you will be using with the program.

Note: The following language keyboards are supported: English, French, German, Spanish, and Japanese.

You will then see one or more reminders about configuring storage devices, and then you will be presented with the Lenovo License Agreement. Read the license agreement carefully. You must agree with terms in order to continue.

After agreeing to the license agreement, you will be given a choice of continuing to the main program interface or using a shortcut to install an operating system based a response file that you previously created using the EasyStartup program.

If you continue to the main program interface, you will have the following selectable options:

- **Compatibility notes:** This selection provides information about the operating systems and server configurations supported by that version of the EasyStartup program.
- **User Guide:** This selection provides information about the features provided by that version of the EasyStartup program.
- **Hardware list:** This selection displays a list of hardware devices detected by the EasyStartup program.
- **Install operating system:** This selection displays a series of choices and prompts to collect information required for installation, prepares the hard disk for installation, and then initiates the installation process using the user-provided operating-system installation CD or DVD.
- **About:** This selection displays version information and legal notices.

Typical operating system installation: When you select **Install operating system**, you will be prompted for information required for the installation. This section describes the tasks associated with a typical operating system installation. Each task must be completed in order before moving to the next task.

- **Select operating system:** This task enables you to select that operating system you will be installing.
- **Select disk:** This task enables you to select the disk where you want to install the operating system.

Note: The disk that you select must be set as the boot disk in BIOS.

- **Partitions options:** This task enables you to choose whether you want to repartition the selected drive or use an existing partition.

- **Partition settings:** This task enables you to choose the file system type and define the partition size.
- **Installation settings:** This task prompts you for user and system settings, time zone, the operating system product key, and the administrator password.
- **Network settings:** This task prompts you for domain and workgroup settings, Ethernet controller type, IP address settings, DNS settings, and WINS address settings.
- **Install applications:** This task enables you to run custom commands or scripts at the end of the installation process, install ThinkServer EasyManage software to help you manage your servers, and install the ThinkServer EasyUpdate program to keep your servers up to date.
- **Confirm settings:** This task enables you to review all of the information you provided and optionally save the information on a diskette or USB device as a response file for future installations on similarly configured Lenovo servers.
- **Start installation:** This task starts the actual installation process. First, the disk is prepared using the disk and partition information you specified. Then you are prompted to insert the operating system disk and the operating system is installed using the information that you specified.

Installing your operating system without using EasyStartup

If you have already configured the server hardware and you are not using the EasyStartup program to install your operating system, complete the following steps to download the latest operating-system installation instructions from the Lenovo Web site:

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to: <http://www.lenovo.com/support>.
2. Enter your product number (machine type and model number) or select **Servers** from the **Select your product** list.
3. Select **Servers** from the **Brand** list.
4. From **Family** list, select **ThinkServer TS100**, and click **Continue**.
5. Select the operating system that you want from the **Operating system** list, and click **Continue**.
6. Click **Operating system installation** to download instructions to install the operating system.

Using the mini-baseboard management controller utility programs

Use the mini-baseboard management controller utility programs to configure the mini-baseboard management controller, download firmware updates and SDR/FRU updates, and remotely manage a network.

Using the mini-baseboard management controller setup utility program

Use the mini-baseboard management controller setup utility program to view or change mini-baseboard management controller information, user management, LAN configuration, and LAN alert settings. To download the program, complete the following steps.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to: <http://www.lenovo.com/support>.

2. Enter your product number (machine type and model number) or select **Servers** from the **Select your product** list.
3. Select **Servers** from the **Brand** list.
4. From **Family** list, select **ThinkServer TS100**, and click **Continue**.
5. Click **Downloads and drivers** to download firmware updates.
6. From the BMC software, copy the files bmc.exe and Init.ini to a setup utility diskette.

To start the mini-baseboard management controller setup utility program, complete the following steps:

1. Turn on the server.
2. Insert the setup utility diskette into the diskette drive.
3. From a command line, type bmc and press Enter.

For the program to interface with the mini-baseboard management controller, the parameters in the Intf.ini file must be set correctly. To modify the Intf.ini file, select **0** from the main menu and use the arrow keys to select settings for the following parameters:

- **System interface:** This is the interface through which system software sends and receives messages to and from the mini-baseboard management controller. Select **KCS** (keyboard controller style).
- **Port Address:** This is the base address of the system interface.
- **Register Spacing:** Select **ByteBoundary**, **ThirtyTwoBitBoundary**, or **SixteenBitBoundary**.
- **Channel Number:** Use the arrow keys to select the channel number (0 through 15).
- **DHCP Mode:** This is the LAN configuration address source.

Using the mini-baseboard management controller configuration utility program

Use the mini-baseboard management controller configuration utility program to view or change the mini-baseboard management controller configuration settings and to save the configuration to a file for use on multiple servers.

To download the program, complete the following steps.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to: <http://www.lenovo.com/support>.
2. Enter your product number (machine type and model number) or select **Servers** from the **Select your product** list.
3. Select **Servers** from the **Brand** list.
4. From **Family** list, select **ThinkServer TS100**, and click **Continue**.
5. Click **Downloads and drivers** to download firmware updates.
6. From the BMC software, copy the file bmc_cfg.exe to a configuration utility diskette.

To start the mini-baseboard management controller configuration utility program, complete the following steps:

1. Turn on the server.
2. Insert the configuration utility diskette into the diskette drive.

3. From a command line, type `bmc_cfg` and press Enter.

For the program to interface with the mini-baseboard management controller, the parameters in the `Intf.ini` file must be set correctly. To modify the `Intf.ini` file, use the mini-baseboard management controller setup utility program or a text editor.

Using the mini-baseboard management controller firmware updates utility program

Use the mini-baseboard management controller firmware update utility program to download a mini-baseboard management controller firmware update. This program updates the mini-baseboard management controller firmware only and does not affect any device drivers.

Important: To ensure proper server operation, be sure to update the mini-baseboard management controller firmware before you update the BIOS code.

To download the program, complete the following steps.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to: <http://www.lenovo.com/support>.
2. Enter your product number (machine type and model number) or select **Servers** from the **Select your product** list.
3. Select **Servers** from the **Brand** list.
4. From **Family** list, select **ThinkServer TS100**, and click **Continue**.
5. Click **Downloads and drivers** to download firmware updates.
6. From the BMC software, copy the file `Flash.exe` to a firmware update diskette.

To update the firmware, use one of the following procedures:

- If the Linux or Windows operating-system update package is available from the World Wide Web and you have obtained it, follow the instructions that come with the package.
- If you are using a diskette, complete the following steps:
 1. Turn on the server.
 2. Insert the firmware update diskette into the diskette drive.
 3. From a command line, type `flash -?` and press Enter.

For the program to interface with the mini-baseboard management controller, the parameters in the `Intf.ini` file must be set correctly. To modify the `Intf.ini` file, use the mini-baseboard management controller setup utility program or a text editor.

Using the mini-baseboard management controller SDR/FRU update utility program

Use the mini-baseboard management controller SDR/FRU update utility program to download an SDR/FRU update.

To download the program, complete the following steps.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to: <http://www.lenovo.com/support>.
2. Enter your product number (machine type and model number) or select **Servers** from the **Select your product** list.

3. Select **Servers** from the **Brand** list.
4. From **Family** list, select **ThinkServer TS100**, and click **Continue**.
5. Click **Downloads and drivers** to download firmware updates.
6. From the BMC software, copy the file fsloader.exe to an SDR/FRU update diskette.

To start the mini-baseboard management controller SDR/FRU update utility program, complete the following steps:

1. Turn on the server.
2. Insert the SDR/FRU update diskette into the diskette drive.
3. From a command line, type fsloader -? and press Enter.

Using the mini-baseboard management controller management utility program:

Use the mini-baseboard management controller management utility program to remotely manage and configure a server network. The following features are available from the program:

- **IPMI (Intelligent Platform Management Interface) Shell**

Use this feature to remotely perform power-management and system identification control functions over a LAN or serial port interface from a command-line interface. Use this feature also to remotely view the event log.

- **Serial over LAN Proxy**

Use this feature to remotely perform control and management functions over a Serial over LAN network. Use this feature also to remotely view and change the BIOS settings.

To download the utility program and create the mini-baseboard management controller management utility CD, complete the following steps.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to: <http://www.lenovo.com/support>.
2. Enter your product number (machine type and model number) or select **Servers** from the **Select your product** list.
3. Select **Servers** from the **Brand** list.
4. From **Family** list, select **ThinkServer TS100**, and click **Continue**.
5. Click **Downloads and drivers** to download firmware updates.
6. From the BMC software, use the information on the CD to install and use the program.

Using the Boot Menu program

The Boot Menu program is a built in, menu-driven configuration program that you can use to temporarily redefine the first startup device without changing settings in the Configuration/Setup Utility program.

To use the Boot Menu program, complete the following steps:

1. Restart the server.
2. Press F12.
3. Select the startup device.

The next time the server is started, it returns to the startup sequence that is set in the Configuration/Setup Utility program.

Enabling the Broadcom NetXtreme Gigabit Ethernet Boot Agent

The Broadcom NetXtreme Gigabit Ethernet Boot Agent is part of the BIOS. You can use it to configure the network as a startable device, and you can customize where the network Startup optional devices occurs in the startup sequence. Enable and disable the Broadcom NetXtreme Gigabit Ethernet Boot Agent from the Configuration/Setup Utility program.

To enable the Broadcom NetXtreme Gigabit Ethernet boot agent, complete the following steps:

1. From the Configuration/Setup Utility main menu, select **Devices and I/O Ports**. Select **Planar Ethernet** and set it to **Enabled**, if it is not already enabled. Press Esc to exit.
2. From the **Start Options** menu choice, press Enter and make sure that **Planar Ethernet PXE/DHCP** is set to **Enabled**. Select **Startup Sequence Options** and press Enter; then, set the network-planar device as the first startup device.
3. Press Esc twice to exit.
4. Select **Save Settings** in the Configuration/Setup Utility main menu and press Enter to save your changes.

Configuring the Broadcom NetXtreme Gigabit Ethernet controller

The Ethernet controller is integrated on the system board. It provides an interface for connecting to a 10 Mbps, 100 Mbps, or 1 Gbps network and provides full duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet port in the server supports auto-negotiation, the controller detects the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operates at that rate and mode.

You do not have to set any jumpers or configure the controller. However, you must install a device driver to enable the operating system to address the controller. For device drivers and information about configuring the Ethernet controller, see the *Broadcom NetXtreme Gigabit Ethernet Software* CD that comes with the server. To find updated information about configuring the controller, complete the following steps.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to: <http://www.lenovo.com/support>.
2. Enter your product number (machine type and model number) or select **Servers** from the **Select your product** list.
3. Select **Servers** from the **Brand** list.
4. From **Family** list, select **ThinkServer TS100**, and click **Continue**.

LSI Configuration Utility program

Use the LSI Configuration Utility program to configure and manage redundant array of independent disks (RAID) arrays. Be sure to use this program as described in this document.

- Use the LSI Configuration Utility program to:
 - Perform a low-level format on a hard disk drive
 - Create an array of hard disk drives with or without a hot-spare drive
 - Set protocol parameters on hard disk drives

The integrated SAS/SATA controller with RAID capabilities supports RAID arrays. You can use the LSI Configuration Utility program to configure RAID 1 (IM), RAID 1E (IME), and RAID 0 (IS) for a single pair of attached devices. If you install a different type of RAID adapter, follow the instructions in the documentation that comes with the adapter to view or change settings for attached devices.

In addition, you can download an LSI command-line configuration program from: <http://www.lenovo.com/support>.

When you are using the LSI Configuration Utility program to configure and manage arrays, consider the following information:

- The integrated SAS/SATA controller with RAID capabilities supports the following features:
 - Integrated Mirroring (IM) with hot-spare support (also known as RAID 1)
Use this option to create an integrated array of two disks plus up to two optional hot spares. All data on the primary disk can be migrated.
 - Integrated Mirroring Enhanced (IME) with hot-spare support (also known as RAID 1E)
Use this option to create an integrated mirror enhanced array of three to eight disks, including up to two optional hot spares. All data on the array disks will be deleted.
 - Integrated Striping (IS) (also known as RAID 0)
Use this option to create an integrated striping array of two to eight disks. All data on the array disks will be deleted.
- Hard disk drive capacities affect how you create arrays. The drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
- If you use an integrated SAS/SATA controller with RAID capabilities to configure a RAID 1 (mirrored) array after you have installed the operating system, you will lose access to any data or applications that were previously stored on the secondary drive of the mirrored pair.
- If you install a different type of RAID controller, see the documentation that comes with the controller for information about viewing and changing settings for attached devices.

Starting the LSI Configuration Utility program

To start the LSI Configuration Utility program, complete the following steps:

1. Turn on the server.
2. When the prompt <<< Press <CTRL><C> to start LSI Configuration Utility >>> is displayed, press Ctrl+C. If you have set an administrator password, you are prompted to type the password.
3. To select a controller (channel) from the list of adapters, use the arrow keys and press Enter.
4. To change the settings of the selected items, follow the instructions on the screen. If you select **Raid Properties**, **SAS Topology**, or **Advanced Adapter Properties** additional screens are displayed.

When you have finished changing settings, press Esc to exit from the program; select **Save** to save the settings that you have changed.

Formatting a hard disk drive

Low-level formatting removes all data from the hard disk. If there is data on the disk that you want to save, back up the hard disk before you perform this procedure.

Note: Before you format a hard disk, make sure that the disk is not part of a mirrored pair.

To format a drive, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drive that you want to format and press Enter.
2. Select **SAS Topology** and press Enter.
3. Select **Direct Attach Devices** and press Enter.
4. To highlight the drive that you want to format, use the Up Arrow and Down Arrow keys. To scroll left and right, use the Left Arrow and Right Arrow keys or the End key. Press Alt+D.
5. To start the low-level formatting operation, select **Format** and press Enter.

Creating a RAID array of hard disk drives

To create a RAID array of hard disk drives, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drives that you want to mirror.
2. Select **RAID Properties**.
3. Select the type of array that you want to create.
4. Use the arrow keys to highlight the first drive in the pair; then, press the Minus (-) or Plus (+) key to change the mirror value to **Primary**.
5. Continue to select the next drive using the Minus (-) or Plus (+) key until you have selected all the drives for your array.
6. Press C to create the disk array.
7. Select **Apply changes and exit menu** to create the array.

Setting up a Remote Supervisor Adapter II SlimLine

This section describes how to set up, cable, and configure a Remote Supervisor Adapter II SlimLine for use on an Advanced System Management (ASM) network so that you can manage the server remotely.

In addition to the information in this section, see the documentation that comes with the Remote Supervisor Adapter II SlimLine for information about how to configure and use an ASM network to manage the server remotely through the Web-based interface or the text-based interface.

Note: The Web-based interface and text-based interface do not support double-byte character set (DBCS) languages.

Requirements

Make sure that you have completed the following procedures before you set up the Remote Supervisor Adapter II SlimLine:

- Install the operating system, using the EasyStartup program and the documentation that comes with the operating system.
- If you plan to use the remote disk function, install the following software:
 - On the server, install Microsoft Windows 2000 with Service Pack 3 or later.
 - On the client system, install Microsoft Windows 2000 or later and the Java 1.4 or later Plug-in.

- Make sure that the server has an Internet connection, so that you can download software and firmware from the Lenovo support Web site during the installation process.
- If you plan to configure Simple Network Management Protocol (SNMP) trap alerts on the Remote Supervisor Adapter II SlimLine, install and compile the management information base (MIB) on the SNMP manager.
- If you plan to use the Web-based interface to access the Remote Supervisor Adapter II SlimLine remotely, install the Java 1.4 or later Plug-in and one of the following Web browsers on the client system:
 - Microsoft Internet Explorer version 5.5 with the latest Service Pack
 - Netscape Navigator version 7.0 or later
 - Mozilla version 1.3 or later
 The Web browser must be Java-enabled and must support JavaScript™.

Cabling the Remote Supervisor Adapter II SlimLine

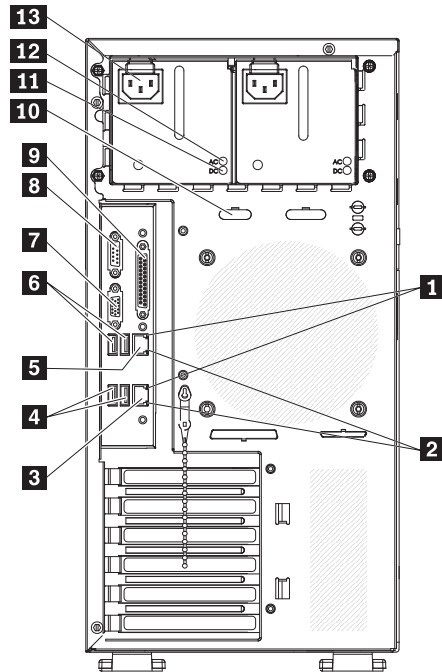
You can manage the server remotely through the Remote Supervisor Adapter II SlimLine by using one of the user interfaces and one of the connection methods that are described in the following table.

Table 3. Cabling tasks to enable remote access to the Remote Supervisor Adapter II SlimLine

User interface to Remote Supervisor Adapter II SlimLine	Connection to Remote Supervisor Adapter II SlimLine
ASM Web-based interface using HTTP	LAN using the Ethernet connector
Text-based interface using Telnet	

To connect the Ethernet cables, complete the following steps:

1. Connect one end of a Category 3 or Category 5 Ethernet cable to the dedicated Ethernet connector for the Remote Supervisor Adapter II SlimLine. Connect the other end of the cable to the network. The following illustration shows the locations of the Ethernet connectors.
2. To make sure that the network connection is working, check the Ethernet LEDs. The following illustration shows the locations of the LEDs.



- | | | | |
|----------|--|-----------|---------------------------|
| 1 | Ethernet transmit/ receive activity LED (amber) | 8 | Serial 1 (Com1) connector |
| 2 | Ethernet link status LED (green) | 9 | Parallel connector |
| 3 | Remote Supervisor Adapter II SlimLine (Ethernet) connector | 10 | Serial 2 (Com2) connector |
| 4 | USB connectors 1 and 2 | 11 | DC power LED |
| 5 | Ethernet connector | 12 | AC power LED |
| 6 | USB connectors 3 and 4 | 13 | Power cord connector |
| 7 | Video connector | | |

Installing the Remote Supervisor Adapter II SlimLine firmware

The software and firmware files that you need are contained in one system service package installation kit. The kit contains the following files:

- Software and firmware installation instructions
- BIOS code update with support for the Remote Supervisor Adapter II SlimLine
- Diagnostics code update
- Remote Supervisor Adapter II SlimLine device drivers
- Remote Supervisor Adapter II SlimLine firmware update
- Integrated service processor firmware update
- Video device driver
- Firmware-update utility program

To download and install the software and firmware, complete the following steps.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to: <http://www.lenovo.com/support>.
2. Enter your product number (machine type and model number) or select **Servers** from the **Select your product** list.

3. Select **Servers** from the **Brand** list.
4. From **Family** list, select **ThinkServer TS100**, and click **Continue**.
5. Click **Downloads and drivers** to download firmware updates.
6. Select the software or firmware package that you want to install. On the next page, click the link for each file that you want to download. Follow the instructions that are displayed.
7. Repeat step 5 until you have downloaded all the files that you need.
8. Follow the instructions in the Remote Supervisor Adapter II SlimLine readme file that you downloaded to install the software and firmware.
9. Restart the server after the software and firmware are installed.

Completing the setup

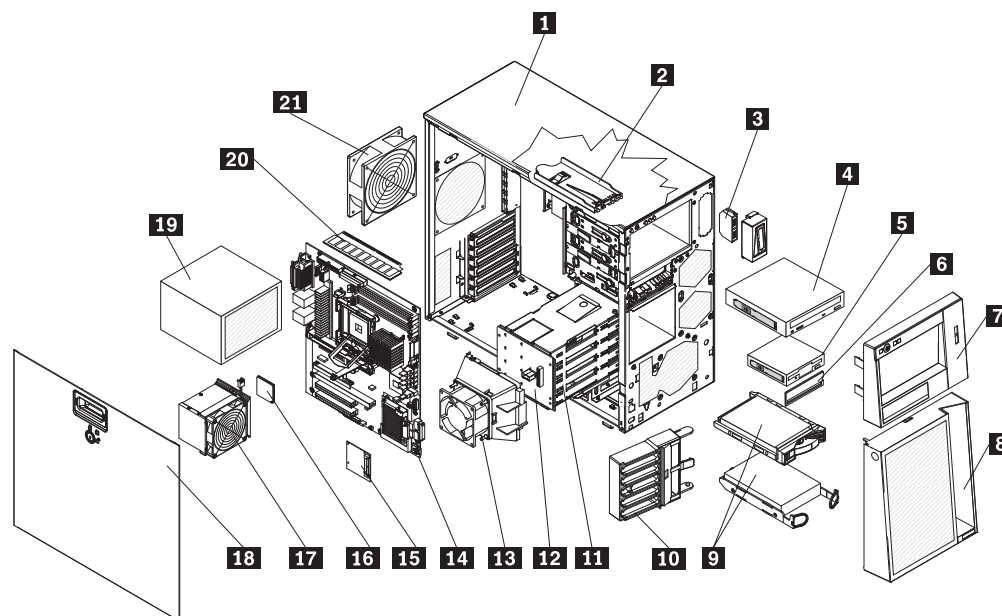
See the documentation that comes with IBM Remote Supervisor Adapter II SlimLine for instructions for completing the configuration, including the following procedures:

- Configuring the Ethernet ports
- Defining login IDs and passwords
- Selecting the events that will receive alert notifications
- Monitoring remote server status by using the Remote Supervisor Adapter II SlimLine Web-based interface
- Controlling the server remotely
- Virtually attaching a remote diskette drive, CD or DVD drive, or disk image to the server

After you configure the Remote Supervisor Adapter II SlimLine, use the Web-based interface to create a backup copy of the configuration so that you can restore the configuration, if you have to replace the adapter. For more information, see the Remote Supervisor Adapter II SlimLine documentation.

Chapter 3. Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434

The following replaceable components are available for all models of the ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434 server, except as specified otherwise in Table 4 on page 38. For an updated parts listing, consult the latest version of the *Hardware Maintenance Manual* on the Lenovo Support Web site.



- | | |
|-----------|-------------------------------|
| 1 | Chassis assembly |
| 2 | Front-panel assembly |
| 3 | Front USB connector assembly |
| 4 | Optical drive |
| 5 | Diskette drive |
| 6 | Bezels, drive |
| 7 | Bezel, upper |
| 8 | Bezel, lower |
| 9 | Hard disk drive |
| 10 | Front adapter support bracket |
| 11 | Hard disk drive cage |

- | | |
|-----------|------------------------------|
| 12 | Hard disk drive backplate |
| 13 | Hard disk drive fan assembly |
| 14 | System board assembly |
| 15 | SAS/SATA controller |
| 16 | Microprocessor |
| 17 | Heat sink |
| 18 | Cover |
| 19 | Non-hot-swap power supply |
| 20 | DIMM |
| 21 | Rear system fan |

Replaceable server components

Replaceable components are of three types:

- **Self-service customer replaceable unit (CRU):** Replacement of self-service CRUs is your responsibility. If Lenovo installs a self-service CRU at your request, you will be charged for the installation.
- **Optional-service customer replaceable unit:** You may install an optional-service CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

Table 4. Parts listing, Types 6431

Index	Description	CRU part number (Self-service)	CRU part number (Optional-service)	FRU part number
1	Chassis assembly (all models)		44X0386	
2	Control Panel Assembly (all models)		44E7571	
3	Front USB connector assembly (all models)		26K7340	
4	Optical drive, DVD-Ramble Half-HighSATA (optional) (all models)	43W8467		
4	Optical drive, DVD-ROM Half-HighSATA (optional) (models 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14Q 14T 14K 14R 14E 14J 15U 15G 15A 11G 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12Q 12T 12B 12H 12V 12K 12R 12E 12J)	43W8466		
6	Bezels, drive (all models)		46U1020	
7	Bezel, upper (all models)		46U1020	
8	Bezel, lower (all models)		46U1020	
9	Hard disk drive, SATA, 3.5-inch 160 GB, fixed/simple-swap, with tray (models 11G 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12Q 12T 12B 12H 12V 12K 12R 12E 12J)	45J9632		
9	Hard disk drive, SATA, 3.5- inch 250 GB, fixed/simple-swap, with tray (models)	45J9634		
9	Hard disk drive, SATA, 3.5-inch 500 GB, fixed/simple-swap, with tray (models)	46U1024		
9	Hard disk drive, SATA, 3.5- inch 750 GB, fixed/simple-swap, with tray (models)	45J9638		
9	Hard disk drive, SATA, 3.5-inch 160 GB, 10K, hot-swap, with tray (models 11G 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12Q 12T 12B 12H 12V 12K 12R 12E 12J)	45J9640		
9	Hard disk drive, SATA, 3.5-inch 250 GB, 10K, hot-swap, with tray (models)	45J9642		
9	Hard disk drive, SATA, 3.5-inch 500 GB, 10K, hot-swap, with tray (models)	45J9644		

Table 4. Parts listing, Types 6431 (continued)

Index	Description	CRU part number (Self-service)	CRU part number (Optional-service)	FRU part number
9	Hard disk drive, SATA, 3.5-inch 750 GB, 10K, hot-swap, with tray (models)	45J9646		
9	Hard disk drive, SAS, 3.5-inch 146 GB, 15K, hot-swap, with tray (models)	45J9658		
9	Hard disk drive, SAS, 3.5-inch 300 GB, 15K, hot-swap, with tray (models)	45J9660		
9	Hard disk drive, 450GB 15K SAS 3.5" HS HDD 300GB 15K (models)	46U2108		
9	Hard disk drive, SAS, 2.5-inch 73 GB, 10K, hot-swap, with tray (models)	45J9654		
9	Hard disk drive, SAS, 2.5-inch 146 GB, 10K, hot-swap, with tray (models)	45J9652		
9	Hard disk drive, IBM 1TB 7200 SATA 3.5" HS HDD 1Tb (models)	45J9648		
10	Retention bracket (front), adapter (all models)		13N2993	
11	Hard disk drive cage, 4 BAY 3.5" SS/HS cage (all models)		42C8910	
11	Hard disk drive cage, 4 BAY HS 2.5" cage (all models)		42C8911	
11	Hard disk drive cage, 8X2.5"DASDCAG (models)		44E7299	
12	Hard disk drive backplane (for 2.5-inch and 3.5 in Hot-Swap SAS/SATA hard disk drives) (models)		39Y9757	
12	Hard disk drive backplane (for 3.5-inch Simple-Swap SATA hard disk drives) (all models)		25R8842	
13	Hard disk drive fan assembly (for 3.5-inch drive cage) (all models)		39Y9860	
13	Hard disk drive fan assembly, 2.5" DASD DUCT (all models)		42C7507	
14	System board assembly (models 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14Q 14T 14K 14R 14E 14J 15U 15G 15A 11G 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12Q 12T 12B 12H 12V 12K 12R 12E 12J)		44E7312	
15	LSI SAS/SATA RAID 01 controller (all models)		43V7415	
16	Microprocessor, 800 MHz/2M, 2.4 GHz dual-core (models 11G 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12Q 12T 12B 12H 12V 12K 12R 12E 12J)			44E7641
16	Microprocessor, 1333 MHz/6M, 2.5 GHz quad-core (models)			44E7589
16	Microprocessor, 1333 MHz/12M, 2.66 GHz quad-core (models)			44E7590
16	Microprocessor, 1333 MHz/12M, 3.0 GHz quad-core (models)			44E7591
16	Microprocessor, 1333 MHz/6M, 3.0 GHz dual-core (models 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14Q 14T 14K 14R 14E 14J)			44E7588
16	Microprocessor, E2200 2.2G 1MB (models CTO)			46C1259

Table 4. Parts listing, Types 6431 (continued)

Index	Description	CRU part number (Self-service)	CRU part number (Optional-service)	FRU part number
16	Microprocessor, X3370 3.0G12MB (models CTO)			46C6452
16	Microprocessor, E5300 2.6G2MB (models CTO)			46C6713
16	Microprocessor, E7400 2.8G3MB (models CTO)			46C6714
16	Microprocessor, E7200 2.53G3MB (models CTO 15U 15G 15A)			46M0338
16	Microprocessor, X3330 2.66G6MB (models CTO)			46M0340
17	Heat sink (all models)		43W0401	
18	Side cover with lock (all models)		25R8859	
19	Power supply, non-redundant 401 watt (models 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14Q 14T 14K 14R 14E 14J 11G 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12Q 12T 12B 12H 12V 12K 12R 12E 12J)		39Y7330	
19	Power supply, redundant, 430 watt (optional) (models 15U 15G 15A)		39Y7332	
20	Memory, 1GB 1RX8 1 GBIT DDR2-800 1GBDIMMKIT (models 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14Q 14T 14K 14R 14E 14J12U 12F 12S 12L 12D 12Y 12G 12M 12A 12Q 12T 12B 12H 12V 12K 12R 12E 12J)		46U1059	
20	Memory, 2GB 2RX8 1 GBIT DDR2-800 2GBDIMM (models 15U 15G 15A)		46U1060	
21	System fan, rear (all models)		25R8829	
	Battery, 3.0 volt (all models)		33F8354	
	Cable, 18-inch SATA signal (all models)		39Y9810	
	Cable, 401 watt DAS (for non-redundant power supply and hot-swap drives connection) (all models)		25R8849	
	Cable, diskette drive (optional) (all models)		39Y9728	
	Cable, mini-SAS/SATA 4X signal (all models)		41Y3884	
	EMC I/O shield (for system I/O ports) (all models)	25R8843		
	EMC shield kit (for 5.25 in. and 3.5 in. drive bays) (all models)	13N2997		
	Feet, chassis (all models)	13N2985		
	Keyboard, US (all models)	41A5100		
	Keylock, keyed-alike (all models)		26K7363	
	Keylock, keyed-random (all models)		26K7364	
	Kit, Retainer (for optical and diskette drives) (all models)	39R9369		
	Mouse, optical, 3-button (optional) (all models)	41U3013		
	Power supply cage (for redundant power supplies) (all models)		39Y7324	
	Retention module (for fan sink) (all models)		25R8873	
	System service label (all models)		44E7281	
	Tray assembly, simple-swap (all models)		25R8864	

Table 4. Parts listing, Types 6431 (continued)

Index	Description	CRU part number (Self-service)	CRU part number (Optional-service)	FRU part number
	IBM Ultra320 SCSI PCIe Controller (all models)		43W4325	
	HOOKEBKPLP9 (all models)		44E8783	
	Remote Supervisor Adapter (RSAII) Slimline (all models)		44T1412	
	RSA Slimline Bracket (all models)		41Y9086	
	LSI MR-10M adapter (all models)		43W4341	
	SATA/SAS RAID adapter battery carrier (all models)		43W4342	
	SATA/SAS RAID adapter battery carrier (all models)		43W4343	
	IBM SAS HBA Controller (all models)		25R8071	
	IBM x RAID 10i (all models)		43W4297	
	IBM Ultra320 SCSI Controller 2 (all models)		39R8750	
	Integrated FDD Bezel (all models)		25R8857	
	PSU ADAPTER (all models)		42C7509	
	EMI SHIELD BRACKET (all models)		44E7337	
	Panel Mount Cable Assembly (all models)		13N2413	
	2nd Serial Port (all models)		42C1053	
	1M CABLE (all models)		39R6530	
	3M CABLE (all models)		39R6532	
	Interposer cable (all models)		44E7578	
	SIDE/TOP COVER (all models)		25R8836	
	Misc. Kit (all models)		39Y9773	
	Thermal Grease (all models)		41Y9292	
	ALCOHOL WIPE (all models)		59P4739	
	HDD SHIELD (all models)		44X0388	
	C2 Cable RoHS (all models)		39Y9783	
	Simple Swap Tray Assembly (all models)		25R8864	
	HDD Carrier Assembly (all models)		42C7495	
	PRO/1000GTSV (all models)		39Y6107	
	Qlogic 4 Gbs PCI-E single port fiber channel adapter CRU (all models)		39R6526	
	Qlogic 4 Gbs PCI-E dual port fiber channel adapter CRU (all models)		39R6528	
	PRO/1K PT Dual (all models)		39Y6128	
	Qlogic iSCSI single-port PCIe HBA adapter (all models)		39Y6148	
	Qlogic iSCSI dual-port PCIe HBA adapter (all models)		42C1772	
	Emulex 4 Gbs PCI-E single port fiber channel adapter (all models)		43W7510	
	Emulex 4 Gbs PCI-E dual port fiber channel adapter (all models)		43W7512	
	LSI MR-10i Adapter battery (all models)		43W4301	

Table 4. Parts listing, Types 6431 (continued)

Index	Description	CRU part number (Self-service)	CRU part number (Optional-service)	FRU part number
	FRUGBM (all models)		44E7342	
	FRUGBM (all models)		44E7343	
	OEM / SpecIBids FRUGBM (all models)		44E7344	
	EULER 2.5" HDD BACKPLANE (all models)		43X0334	
	PCI-X Slot Enablement card (all models)		44E4851	
	HSDriveIDs (all models)		41Y3903	
	SYSServiceOEM (all models)		44T2135	

Table 5. Parts listing, Types 6432

Index	Description	CRU part number (Self-service)	CRU part number (Optional-service)	FRU part number
1	Chassis assembly (all models)		44X0386	
2	Front-panel assembly (all models)		44E7571	
3	Front USB connector assembly (all models)		26K7340	
4	Multiburner, SATA Rambo 8 (optional) (all models)	43W8467		
4	DVD-ROM drive, SATA 16/48 (optional) (models 17U 17F 17S 17L 17D 17Y 17G 17M 17A 17Q 17T 17K 17R 17E 17J 18G 18H 19G 19H 12U 12F 12S 12L 12D 12Y 12G 12B 12H 12V 13G 14G 15U 15F 15S 15L 15D 15Y 15G 15M 15A 15Q 15T 15B 15H 15V 15K 15R 15E 15J 16G)	43W8466		
6	Bezels, drive (all models)		46U1020	
7	Bezel, upper (all models)		46U1020	
8	Bezel, lower (all models)		46U1020	
9	Hard disk drive, SATA, 3.5-inch 160 GB, fixed/simple-swap, with tray (models 18G 18H 19G 19H 11M 11A 11Q 11T 11K 11R 11E 11J 13G)	45J9632		
9	Hard disk drive, SATA, 3.5- inch 250 GB, fixed/simple-swap, with tray (models 14G 16G)	45J9634		
9	Hard disk drive, SATA, 3.5-inch 500 GB, fixed/simple-swap, with tray (models)	46U1024		
9	Hard disk drive, SATA, 3.5- inch 750 GB, fixed/simple-swap, with tray (models)	45J9638		
9	Hard disk drive, SATA, 3.5-inch 160 GB, 10K, hot-swap, with tray (models 18G 18H 19G 19H 11M 11A 11Q 11T 11K 11R 11E 11J 13G)	45J9640		
9	Hard disk drive, SATA, 3.5-inch 250 GB, 10K, hot-swap, with tray (models 14G 16G)	45J9642		
9	Hard disk drive, SATA, 3.5-inch 500 GB, 10K, hot-swap, with tray (models)	45J9644		
9	Hard disk drive, SATA, 3.5-inch 750 GB, 10K, hot-swap, with tray (models)	45J9646		
9	Hard disk drive, SAS, 3.5-inch 146 GB, 15K, hot-swap, with tray (models)	45J9658		
9	Hard disk drive, SAS, 3.5-inch 300 GB, 15K, hot-swap, with tray (models)	45J9660		
9	Hard disk drive, SAS, 2.5-inch 73 GB, 10K, hot-swap, with tray (models)	45J9654		
9	Hard disk drive, SAS, 2.5-inch 146 GB, 10K, hot-swap, with tray (models)	45J9652		
9	Hard disk drive, SATA 3.5-inch 1TB , hot-swap (models)	45J9648		
10	Retention bracket (front), adapter (all models)		13N2993	
11	Hard disk drive cage, 3.5-inch drives (all models)	42C8910		
11	Hard disk drive cage, 2.5-inch drives (four bays) (all models)	42C8911		

Table 5. Parts listing, Types 6432 (continued)

Index	Description	CRU part number (Self-service)	CRU part number (Optional-service)	FRU part number
11	Hard disk drive cage, 2.5-inch drives (eight bays) (all models)	44E7299		
12	Hard disk drive backplane (for 2.5-inch and 3.5 in Hot-Swap SAS/SATA hard disk drives) (all models)		39Y9757	
12	Hard disk drive backplate (for 3.5-inch Simple-Swap SATA hard disk drives) (models)		25R8842	
13	Hard disk drive fan assembly (for 3.5-inch drive cage) (all models)		39Y9860	
13	Hard disk drive fan assembly (for 2.5-inch drive cage with 4 bays) (all models)		42C7507	
13	Hard disk drive fan assembly (for 2.5-inch drive cage with 8 bays) (all models)		44E7301	
14	System board assembly (models 17U 17F 17S 17L 17D 17Y 17G 17M 17A 17Q 17T 17K 17R 17E 17J 18G 18H 19G 19H 11M 11A 11Q 11T 11K 11R 11E 11J 12U 12F 12S 12L 12D 12Y 12G 12B 12H 12V 13G 14G 15U 15F 15S 15L 15D 15Y 15G 15M 15A 15Q 15T 15B 15H 15V 15K 15R 15E 15J 16G)			44E7312
15	LSI SAS/SATA RAID 01 controller (all models)		43V7415	
16	Microprocessor, 800 MHz/2M, 2.4 GHz dual-core (models 11M 11A 11Q 11T 11K 11R 11E 11J 12U 12F 12S 12L 12D 12Y 12G 12B 12H 12V)			44E7641
16	Microprocessor, 1333 MHz/6M, 2.5 GHz quad-core (models 16G)			44E7589
16	Microprocessor, 1333 MHz/12M, 2.66 GHz quad-core (models)			44E7590
16	Microprocessor, 1333 MHz/12M, 3.0 GHz quad-core (models)			44E7591
16	Microprocessor, 1333 MHz/6M, 3.0 GHz dual-core (models 19G 19H 13G 14G 15U 15F 15S 15L 15D 15Y 15G 15M 15A 15Q 15T 15B 15H 15V 15K 15R 15E 15J)			44E7588
16	Microprocessor, E2200 2.2G 1MB (models CTO)			46C1259
16	Microprocessor, X3370 3.0G12MB (models CTO)			46C6452
16	Microprocessor, E5300 2.6G2MB (models CTO)			46C6713
16	Microprocessor, E7400 2.8G3MB (models CTO)			46C6714
16	Microprocessor, E7200 2.53G3MB (models CTO 17U 17F 17S 17L 17D 17Y 17G 17M 17A 17Q 17T 17K 17R 17E 17J 18G 18H)			46M0338
16	Microprocessor, X3330 2.66G6MB (models CTO)			46M0340
17	Fan sink (all models)		43W0401	
18	Side cover with lock (all models)		25R8859	

Table 5. Parts listing, Types 6432 (continued)

Index	Description	CRU part number (Self-service)	CRU part number (Optional-service)	FRU part number
19	Power supply, non-redundant 401 watt (models 17U 17F 17S 17L 17D 17Y 17G 17M 17A 17Q 17T 17K 17R 17E 17J 18G 18H 19G 19H 11M 11A 11Q 11T 11K 11R 11E 11J 12U 12F 12S 12L 12D 12Y 12G 12B 12H 12V 13G 14G 15U 15F 15S 15L 15D 15Y 15G 15M 15A 15Q 15T 15B 15H 15V 15K 15R 15E 15J 16G)		39Y7330	
19	Power supply, redundant, 430 watt (optional) (models)		39Y7332	
20	Memory, 1 GB DDR2/800 MHz ECC (models 17U 17F 17S 17L 17D 17Y 17G 17M 17A 17Q 17T 17K 17R 17E 17J 18G 18H 19G 19H 12U 12F 12S 12L 12D 12Y 12G 12B 12H 12V 13G)		46U1017	
20	Memory, 2 GB DDR2/800 MHz ECC (models 14G 15U 15F 15S 15L 15D 15Y 15G 15M 15A 15Q 15T 15B 15H 15V 15K 15R 15E 15J 16G)		46U1018	
20	Memory, 4GB DDR2/800 MHz ECC (models)		46U1019	
21	System fan, rear (all models)		25R8829	
	Battery, 3.0 volt (all models)		33F8354	
	Cable, 18-inch SATA signal (all models)		39Y9810	
	Cable, 401 watt DAS (for non-redundant power supply and hot-swap drives connection) (all models)		25R8849	
	Cable, diskette drive (optional) (all models)		39Y9728	
	Cable, mini-SAS/SATA 4X signal (all models)		41Y3884	
	EMC I/O shield (for system I/O ports) (all models)	25R8843		
	EMC shield kit (for 5.25 in. and 3.5 in. drive bays) (all models)	13N2997		
	Feet, chassis (all models)	13N2985		
	Keyboard, US (all models)	41A5100		
	Keylock, keyed-alike (all models)		26K7363	
	Keylock, keyed-random (all models)		26K7364	
	Kit, Retainer (for optical and diskette drives) (all models)	39R9369		
	Mouse, optical, 3-button (optional) (all models)	41U3013		
	Power supply cage (for redundant power supplies) (all models)		39Y7324	
	Retention module (for fan sink) (all models)		25R8873	
	System service label (all models)	44E7281		
	Tray assembly, simple-swap (all models)		25R8864	
	IBM Ultra320 SCSI PCIe Controller (all models)		43W4325	
	Remote Supervisor Adapter (RSAII) Slimline (all models)		44T1412	
	RSA Slimline Bracket (all models)		41Y9086	
	SATA/SAS RAID adapter (all models)		43W4341	
	SATA/SAS RAID adapter battery (all models)		43W4342	
	SATA/SAS RAID adapter battery carrier (all models)		43W4343	

Table 5. Parts listing, Types 6432 (continued)

Index	Description	CRU part number (Self-service)	CRU part number (Optional-service)	FRU part number
	IBM SAS HBA Controller (all models)		25R8071	
	IBM x RAID 10i (all models)		43W4297	
	IBM Ultra320 SCSI Controller 2 (all models)		39R8750	

Table 6. Parts listing, Types 6434

Index	Description	CRU part number (Self-service)	CRU part number (Optional-service)	FRU part number
1	Chassis assembly (all models)		44X0386	
2	Front-panel assembly (all models)		44E7571	
3	Front USB connector assembly (all models)		26K7340	
4	Multiburner, SATA Rambo 8 (optional) (all models)	43W8467		
4	DVD-ROM drive, SATA 16/48 (optional) (models 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13Q 13T 13K 13R 13E 13J 14G 14M 14A 14Q 14T 14H 14K 14R 14E 14J 15U 15F 15S 15L 15D 15Y 15G 15M 15A 15Q 15T 15K 15R 15E 15J 16G 16M 16A 16Q 16T 16K 16J 11U 11F 11S 11L 11D 11Y 12M 12A 12Q 12T 12K 12R 12E 12J)	43W8466		
6	Bezels, drive (all models)		46U1020	
7	Bezel, upper (all models)		46U1020	
8	Bezel, lower (all models)		46U1020	
9	Hard disk drive, SATA, 3.5-inch 160 GB, fixed/simple-swap, with tray (models)	45J9632		
9	Hard disk drive, SATA, 3.5- inch 250 GB, fixed/simple-swap, with tray (models 14G 14M 14A 14Q 14T 14H 14K 14R 14E 14J)	45J9634		
9	Hard disk drive, SATA, 3.5-inch 500 GB, fixed/simple-swap, with tray (models)	46U1024		
9	Hard disk drive, SATA, 3.5- inch 750 GB, fixed/simple-swap, with tray (models)	45J9638		
9	Hard disk drive, SATA, 3.5-inch 160 GB, 10K, hot-swap, with tray (models)	45J9640		
9	Hard disk drive, SATA, 3.5-inch 250 GB, 10K, hot-swap, with tray (models 14G 14M 14A 14Q 14T 14H 14K 14R 14E 14J)	45J9642		
9	Hard disk drive, SATA, 3.5-inch 500 GB, 10K, hot-swap, with tray (models)	45J9644		
9	Hard disk drive, SATA, 3.5-inch 750 GB, 10K, hot-swap, with tray (models)	45J9646		
9	Hard disk drive, SAS, 3.5-inch 146 GB, 15K, hot-swap, with tray (models)	45J9658		
9	Hard disk drive, SAS, 3.5-inch 300 GB, 15K, hot-swap, with tray (models)	45J9660		
9	Hard disk drive, SAS, 2.5-inch 73 GB, 10K, hot-swap, with tray (models)	45J9654		
9	Hard disk drive, SAS, 2.5-inch 146 GB, 10K, hot-swap, with tray (models)	45J9652		
9	Hard disk drive, SATA 3.5-inch 1TB , hot-swap (models)	45J9648		
10	Retention bracket (front), adapter (all models)		13N2993	
11	Hard disk drive cage, 3.5-inch drives (all models)	42C8910		
11	Hard disk drive cage, 2.5-inch drives (four bays) (all models)	42C8911		

Table 6. Parts listing, Types 6434 (continued)

Index	Description	CRU part number (Self-service)	CRU part number (Optional-service)	FRU part number
11	Hard disk drive cage, 2.5-inch drives (eight bays) (all models)	44E7299		
12	Hard disk drive backplane (for 2.5-inch and 3.5 in Hot-Swap SAS/SATA hard disk drives) (all models)		39Y9757	
12	Hard disk drive backplate (for 3.5-inch Simple-Swap SATA hard disk drives) (all models)		25R8842	
13	Hard disk drive fan assembly (for 3.5-inch drive cage) (all models)		39Y9860	
13	Hard disk drive fan assembly (for 2.5-inch drive cage with 4 bays) (all models)		42C7507	
13	Hard disk drive fan assembly (for 2.5-inch drive cage with 8 bays) (all models)		44E7301	
14	System board assembly (models 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13Q 13T 13K 13R 13E 13J 14G 14M 14A 14Q 14T 14H 14K 14R 14E 14J 15U 15F 15S 15L 15D 15Y 15G 15M 15A 15Q 15T 15K 15R 15E 15J 16G 16M 16A 16Q 16T 16K 16J 11U 11F 11S 11L 11D 11Y 12M 12A 12Q 12T 12K 12R 12E 12J)			44E7312
15	LSI SAS/SATA RAID 01 controller (all models)		43V7415	
16	Microprocessor, 800 MHz/2M, 2.4 GHz dual-core (models)			44E7641
16	Microprocessor, 1333 MHz/6M, 2.5 GHz quad-core (models)			44E7589
16	Microprocessor, 1333 MHz/12M, 2.66 GHz quad-core (models 11U 11F 11S 11L 11D 11Y 12M 12A 12Q 12T 12K 12R 12E 12J)			44E7590
16	Microprocessor, 1333 MHz/12M, 3.0 GHz quad-core (models 15U 15F 15S 15L 15D 15Y 15G 15M 15A 15Q 15T 15K 15R 15E 15J)			44E7591
16	Microprocessor, 1333 MHz/6M, 3.0 GHz dual-core (models 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13Q 13T 13K 13R 13E 13J)			44E7588
16	Microprocessor, E2200 2.2G 1MB (models CTO)			46C1259
16	Microprocessor, X3370 3.0G12MB (models CTO)			46C6452
16	Microprocessor, E5300 2.6G2MB (models CTO)			46C6713
16	Microprocessor, E7400 2.8G3MB (models CTO)			46C6714
16	Microprocessor, E7200 2.53G3MB (models CTO)			46M0338
16	Microprocessor, X3330 2.66G6MB (models CTO 14G 14M 14A 14Q 14T 14H 14K 14R 14E 14J 16G 16M 16A 16Q 16T 16K 16J)			46M0340
17	Fan sink (all models)		43W0401	
18	Side cover with lock (all models)		25R8859	
19	Power supply, non-redundant 401 watt (models 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13Q 13T 13K 13R 13E 13J)		39Y7330	

Table 6. Parts listing, Types 6434 (continued)

Index	Description	CRU part number (Self-service)	CRU part number (Optional-service)	FRU part number
19	Power supply, redundant, 430 watt (optional) (models 14G 14M 14A 14Q 14T 14H 14K 14R 14E 14J 15U 15F 15S 15L 15D 15Y 15G 15M 15A 15Q 15T 15K 15R 15E 15J 16G 16M 16A 16Q 16T 16K 16J 11U 11F 11S 11L 11D 11Y 12M 12A 12Q 12T 12K 12R 12E 12J)		39Y7332	
20	Memory, 1 GB DDR2/800 MHz ECC (models 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13Q 13T 13K 13R 13E 13J 14G 14M 14A 14Q 14T 14H 14K 14R 14E 14J 16G 16M 16A 16Q 16T 16K 16J)		46U1017	
20	Memory, 2 GB DDR2/800 MHz ECC (models 15U 15F 15S 15L 15D 15Y 15G 15M 15A 15Q 15T 15K 15R 15E 15J 11U 11F 11S 11L 11D 11Y 12M 12A 12Q 12T 12K 12R 12E 12J)		46U1018	
20	Memory, 4GB DDR2/800 MHz ECC (models)		46U1019	
21	System fan, rear (all models)		25R8829	
	Battery, 3.0 volt (all models)		33F8354	
	Cable, 18-inch SATA signal (all models)		39Y9810	
	Cable, 401 watt DAS (for non-redundant power supply and hot-swap drives connection) (all models)		25R8849	
	Cable, diskette drive (optional) (all models)		39Y9728	
	Cable, mini-SAS/SATA 4X signal (all models)		41Y3884	
	EMC I/O shield (for system I/O ports) (all models)	25R8843		
	EMC shield kit (for 5.25 in. and 3.5 in. drive bays) (all models)	13N2997		
	Feet, chassis (all models)	13N2985		
	Keyboard, US (all models)	41A5100		
	Keylock, keyed-alike (all models)		26K7363	
	Keylock, keyed-random (all models)		26K7364	
	Kit, Retainer (for optical and diskette drives) (all models)	39R9369		
	Mouse, optical, 3-button (optional) (all models)	41U3013		
	Power supply cage (for redundant power supplies) (all models)		39Y7324	
	Retention module (for fan sink) (all models)		25R8873	
	System service label (all models)	44E7281		
	Tray assembly, simple-swap (all models)		25R8864	
	IBM Ultra320 SCSI PCIe Controller (all models)		43W4325	
	Remote Supervisor Adapter (RSAII) Slimline (all models)		44T1412	
	RSA Slimline Bracket (all models)		41Y9086	
	SATA/SAS RAID adapter (all models)		43W4341	
	SATA/SAS RAID adapter battery (all models)		43W4342	
	SATA/SAS RAID adapter battery carrier (all models)		43W4343	
	IBM SAS HBA Controller (all models)		25R8071	

Table 6. Parts listing, Types 6434 (continued)

Index	Description	CRU part number (Self-service)	CRU part number (Optional-service)	FRU part number
	IBM x RAID 10i (all models)		43W4297	
	IBM Ultra320 SCSI Controller 2 (all models)		39R8750	

Power cords

For your safety, Lenovo provides a power cord with a grounded attachment plug to use with this Lenovo product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

Lenovo power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S.): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

Lenovo power cords for a specific country or region are usually available only in that country or region.

Table 7. Power cords, Type 6431

Lenovo Power cord part number	Used in these countries and regions
39M5247	Taiwan (models 12V)
39M5206	China (models)
39M5102	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea (models 14M 12M)
39M5123	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire (models 14G 15G 12G)
39M5130	Denmark (models 14G 15G 12G)

Table 7. Power cords, Type 6431 (continued)

Lenovo Power cord part number	Used in these countries and regions
39M5144	Bangladesh, Lesotho, Macao, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda (models 14G 14M 14A 15A 12G 12M 12A)
39M5151	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe (models 14G 14A 15A 15G 12G 12A)
39M5158	Liechtenstein, Switzerland (models 14G 15G 12G)
39M5165	Chile, Italy, Libyan Arab Jamahiriya (models 14S 14L 14Y 14G 15G 12S 12Y 12L 12G)
39M5172	Israel (models 14G 15G 12G)
39M5179	220 - 240 V Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela (models 14G 15G 12G)
39M5081	110 - 120 V Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela (models 14U 14F 14S 14L 14D 14A 14T 15A 15U 12U 12F 12S 12L 12A 12T)
39M5219	Korea (Democratic People's Republic of), Korea (Republic of) (models 14K 14R 12K 12R)
39M5199	Japan (models 14E 14J 12E 12J)
39M5068	Argentina, Paraguay, Uruguay (models 14Y 12Y)
39M5226	India (models 14Q 12Q)
39M5233	Brazil (models 12P)

Table 8. Power cords, Type 6432

Lenovo Power cord part number	Used in these countries and regions
39M5247	Taiwan (models 12V 15V)
39M5206	China (models)
39M5102	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea (models 17M 11M 15M)

Table 8. Power cords, Type 6432 (continued)

Lenovo Power cord part number	Used in these countries and regions
39M5123	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire (models 17G 18G 19G 12G 13G 14G 15G 16G)
39M5130	Denmark (models 17G 18G 19G 12G 13G 14G 15G 16G)
39M5144	Bangladesh, Lesotho, Macao, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda (models 17G 17M 17A 18G 19G 12G 13G 14G 15G 16G 11M 11A 15M 15A)
39M5151	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe (models 17G 18G 19G 12G 13G 14G 15G 16G)
39M5158	Liechtenstein, Switzerland (models 17G 18G 19G 12G 13G 14G 15G 16G)
39M5165	Chile, Italy, Libyan Arab Jamahiriya (models 17S 17L 17Y 17T 12S 12L 12Y 12G 13G 14G 15S 15L 15Y 15G 16G)
39M5172	Israel (models 17G 18G 19G 12G 13G 14G 15G 16G)
39M5179	220 - 240 V Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela (models 17G 18G 19G 12G 13G 14G 15G 16G)

Table 8. Power cords, Type 6432 (continued)

Lenovo Power cord part number	Used in these countries and regions
39M5081	110 - 120 V Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela (models 17U 17F 17S 17L 17A 17D 17T 11A 11T 12U 12F 12S 12L 12D 15U 15F 15S 15L 15D 15A 15T)
39M5219	Korea (Democratic People's Republic of), Korea (Republic of) (models 11K 15K)
39M5199	Japan (models 11J 15J)
39M5068	Argentina, Paraguay, Uruguay (models 17L 17Y 12L 12Y 15L 15Y)
39M5226	India (models 17Q 11Q 15Q)
39M5233	Brazil (models)

Table 9. Power cords, Type 6434

Lenovo Power cord part number	Used in these countries and regions
39M5247	Taiwan (models)
39M5206	China (models 14H)
39M5102	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea (models 13M 14M 15M 16M 12M)
39M5123	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire (models 13A 14A 15A 16A)
39M5130	Denmark (models 13G 14G 15G 16G)
39M5144	Bangladesh, Lesotho, Macao, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda (models 13M 14M 15M 16M 13G 14G 15G 16G 12M 12A)
39M5151	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe (models 13G 14G 15G 16G)
39M5158	Liechtenstein, Switzerland (models 13G 14G 15G 16G)
39M5165	Chile, Italy, Libyan Arab Jamahiriya (models 13G 14G 15G 16G 13Y 15Y11S 11L 11Y)
39M5172	Israel (models 13G 14G 15G 16G)
39M5179	220 - 240 V Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela (models)

Table 9. Power cords, Type 6434 (continued)

Lenovo Power cord part number	Used in these countries and regions
39M5081	110 - 120 V Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela (models 13T 14T 15T 16T 13A 14A 15A 16A 13U 13F 13S 13L 13D 15U 15F 15S 15L 15D 11U 11F 11S 11D 12A 12T)
39M5219	Korea (Democratic People's Republic of), Korea (Republic of) (models 13K 14K 15K 16K 13R 14R 15R 12K 12R)
39M5199	Japan (models 13E 14E 15E 13J 14J 15J 16J 12J)
39M5068	Argentina, Paraguay, Uruguay (models 13L 13Y 15L 15Y 11Y)
39M5226	India (models 13Q 14Q 15Q 16Q12Q)
39M5233	Brazil (models)

Chapter 4. Removing and replacing server components

Replaceable components are of three types:

- **Self-service customer replaceable unit (CRU):** Replacement of self-service CRUs is your responsibility. If Lenovo installs a self-service CRU at your request, you will be charged for the installation.
- **Optional-service customer replaceable unit:** You may install an optional-service CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine whether a component is a self-service CRU, optional-service CRU, or FRU.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

For additional information and important notes about installing options in the server, see the specific options section in the *User Guide* on the *ThinkServer Documentation DVD*.

Installation guidelines

Before you remove or replace a component, read the following information:

- Read the safety information that begins on page vii and the guidelines in “Handling static-sensitive devices” on page 60. This information will help you work safely.
- When you install your new server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your server is ready to function at maximum levels of performance. You can use the ThinkServer EasyManage software, if applicable, to download the latest firmware updates. You can also download firmware updates from the Lenovo Support Web site.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to: <http://www.lenovo.com/support>.
 2. Enter your product number (machine type and model number) or select **Servers** from the **Select your product** list.
 3. Select **Servers** from the **Brand** list.
 4. From **Family** list, select **ThinkServer TS100**, and click **Continue**.
 5. Click **Downloads and drivers** to download firmware updates.
- Before you install optional hardware devices, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed, or that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see Chapter 5, “Diagnostics,” on page 129 for more information.
 - Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.

- If you must start the server while the cover is removed, make sure that no one is near the server and that no other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
 - Make sure that you stand safely without slipping.
 - Distribute the weight of the object equally between your feet.
 - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
 - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- You do not have to turn off the server to install or replace hot-swap power supplies, hot-plug adapters, or hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before performing any steps that involve removing or installing adapter or system board cables.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported optional devices for the server, go to:
<http://www.lenovo.com/support>

System reliability guidelines

To help ensure proper cooling and system reliability, make sure that:

- If the server has redundant power, each of the power supply bays has a power supply installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 10 minutes of removal.
- You do not run the server without the air baffle installed. Operating the server without the air baffle might cause the microprocessor to overheat.
- The microprocessor socket always contains a microprocessor and fan sink.

Working inside the server with the power on

Attention: Static electricity that is released to internal server components when the server is powered-on might cause the server to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when working inside the server with the power on.

The server supports hot-plug, hot-add, and hot-swap devices and is designed to operate safely while it is turned on and the cover is removed. Follow these guidelines when you work inside a server that is turned on:

- Avoid wearing loose-fitting clothing on your forearms. Button long-sleeved shirts before you work inside the server; do not wear cuff links while you are working inside the server.
- Do not allow your necktie or scarf to hang inside the server.
- Remove jewelry, such as bracelets, necklaces, rings, and loose-fitting wrist watches.
- Remove items from your shirt pocket, such as pens and pencils, that might fall into the server as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hairpins, and screws, into the server.

Handling static-sensitive devices

Attention: Static electricity can damage the server and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

To reduce the possibility of damage from electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available. Always use an electrostatic-discharge wrist strap or other grounding system when working inside the server with the power on.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part on the outside of the server for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the server without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Returning a device or component

If you are instructed to return a device or component, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Connecting the cables

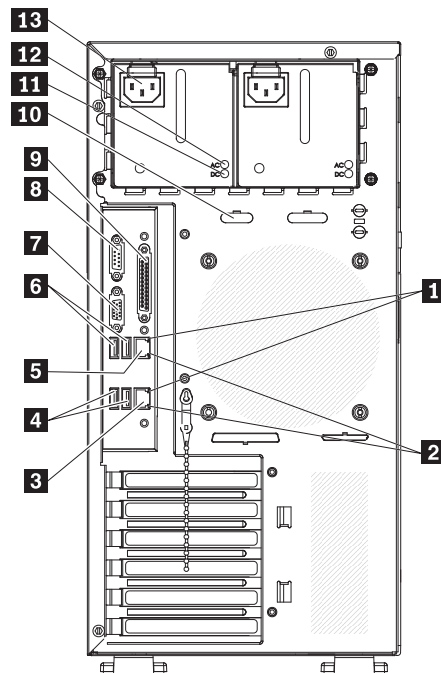
You must turn off the server before you connect any cables to or disconnect any cables from the server.

Note: If the cable that you are connecting or disconnecting is a USB cable, however, you do not have to turn off the server.

See the documentation that comes with optional devices for additional cabling instructions. It might be easier for you to route cables before you install certain devices.

For details about the locations and functions of the input/output connectors, see “Server controls, LEDs, and power” on page 5.

The following illustration shows the locations of the input/output connectors. Detailed cabling instructions for installing the server in a rack are in the *Rack Installation Instructions* that come with the server.



- | | |
|---|-------------------------------------|
| 1 Ethernet transmit/ receive activity LED (amber) | 8 Serial 1 (Com1) connector |
| 2 Ethernet link status LED (green) | 9 Parallel connector |
| 3 Remote Supervisor Adapter II SlimLine (Ethernet) connector | 10 Serial 2 (Com2) connector |
| 4 USB connectors 1 and 2 | 11 DC power LED |
| 5 Ethernet connector | 12 AC power LED |
| 6 USB connectors 3 and 4 | 13 Power cord connector |
| 7 Video connector | |

Removing and replacing self-service CRUs

Replacement of self-service CRUs is your responsibility. If Lenovo installs a self-service CRU at your request, you will be charged for the installation.

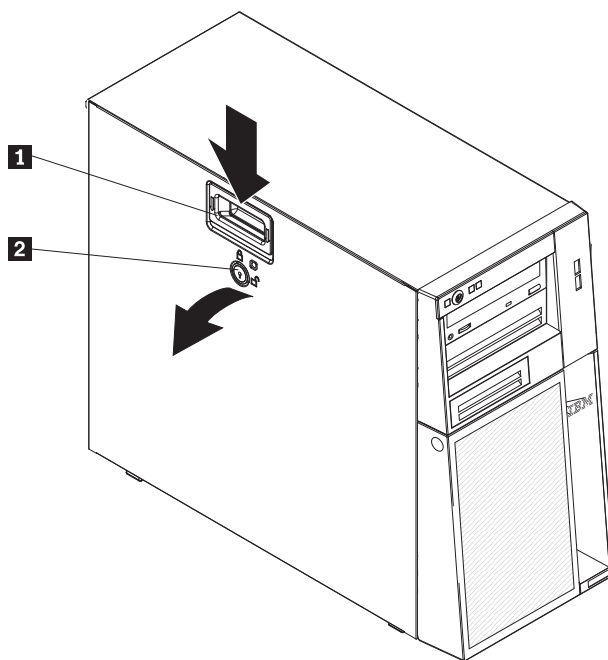
The illustrations in this document might differ slightly from your hardware.

Removing the side cover

Attention: Operating the server for more than 30 minutes with the side cover removed might damage server components. For proper cooling and airflow, replace the side cover before you turn on the server.

To remove the side cover, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. If you are replacing a non-hot-swap component, turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock the side cover.
4. Press the cover-release latch down, as indicated by the two arrows on the latch, and tilt the top of the side cover away from the chassis.



- 1** Cover-release latch Optical drive
- 2** Key lock

5. Lift the side cover off the server and set it aside.
6. If you are instructed to return the side cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the side cover

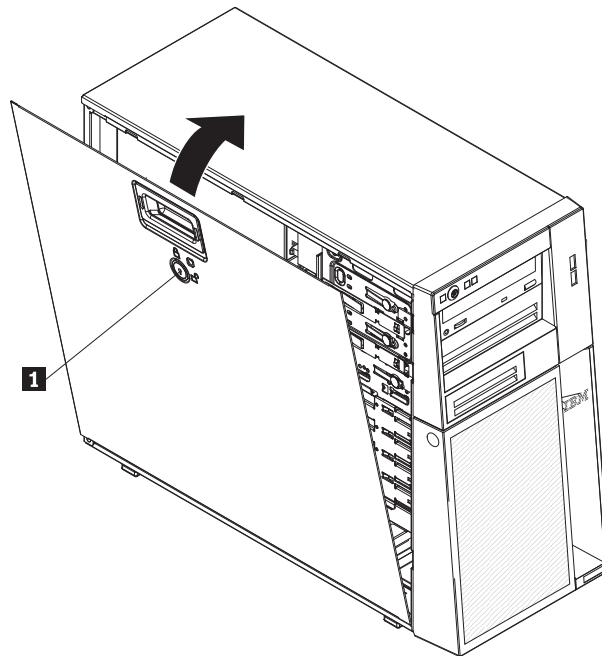
Attention: For proper cooling and airflow, replace the side cover before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the side cover removed might damage server components.

To install the side cover, complete the following steps:

1. Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server. Also, make sure that all internal cables are correctly routed.
2. If you removed the upper and lower bezels, reinstall them before you replace the side cover (see “Installing the upper bezel” on page 67 and “Installing the lower bezel” on page 65).

Important: The cover lock must be in the unlocked (opened) position before you install the side cover.

3. Position the lip on the bottom edge of the side cover on the ledge on the bottom of the chassis; then, rotate the cover up to the chassis. Press down on the cover release latch and push the cover completely closed until it latches securely into place.



4. Lock the side cover.
5. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the lower bezel

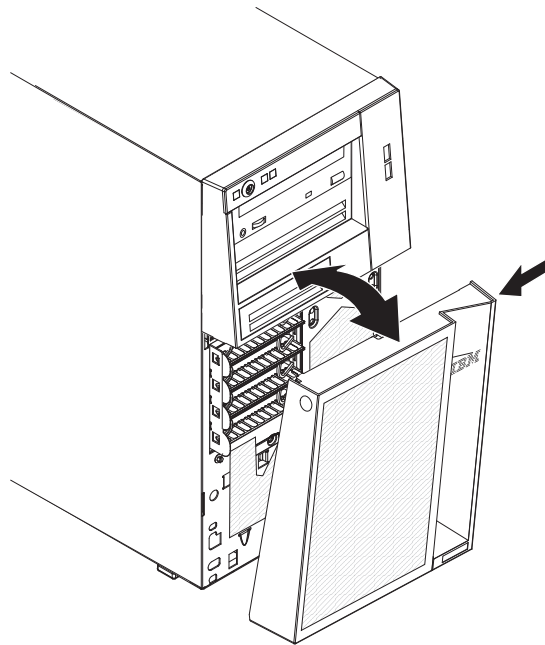
When you work with some devices, such as the drives in bays 4 through 7 (or bays 4 through 11 for some 2.5 inch hard disk drive models), you must first remove the lower bezel to access the devices.

To remove the lower bezel, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. If you are replacing a non-hot-swap component, turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock the side cover.

Note: You do not have to remove the side cover to remove the lower bezel.

4. Press the round blue release button on the right side of the lower bezel and rotate the lower bezel downward to disengage and remove it from the chassis.

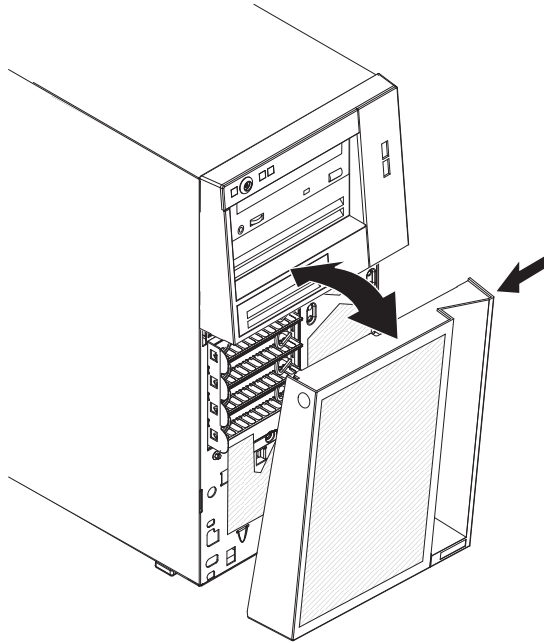


5. If you are instructed to return the lower bezel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the lower bezel

To install the lower bezel, complete the following steps:

1. Insert the two bottom tabs on the lower bezel into the corresponding holes in the front of the chassis.



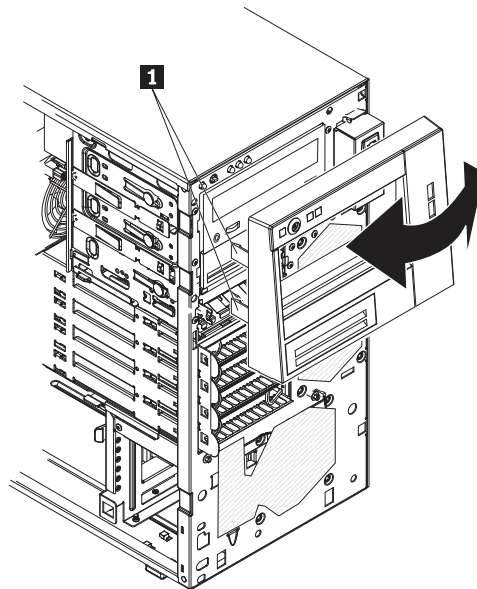
2. Rotate the top of the lower bezel up to the chassis; then, press the blue release tab on the right side of the lower bezel and completely close the lower bezel until it locks securely into place.
3. Lock the side cover.
4. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the upper bezel

When you work with some devices, such as the drives in bays 1 through 3, you must first remove the upper bezel to access the devices.

To remove the upper bezel, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. If you are replacing a non-hot-swap component, turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Remove the lower bezel (see “Removing the lower bezel” on page 64).
5. Carefully lift up the two bezel clips **1** on the left side of the upper bezel; then, rotate the upper bezel to the right side of the server to disengage the two right-side tabs from the chassis.

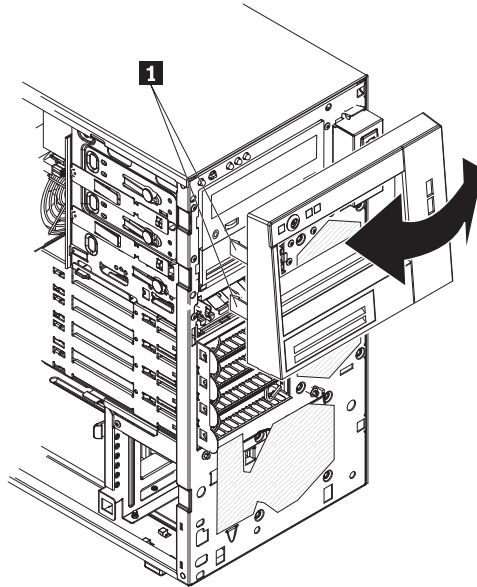


6. If you are instructed to return the upper bezel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the upper bezel

To install the upper bezel, complete the following steps:

1. Insert the two tabs on the right-side of the upper bezel into the corresponding holes on the right side of the chassis.
2. Rotate the upper bezel to the left side of the chassis until the bezel clips **1** are aligned with the corresponding indentations on the left side of the chassis and it snaps into place.



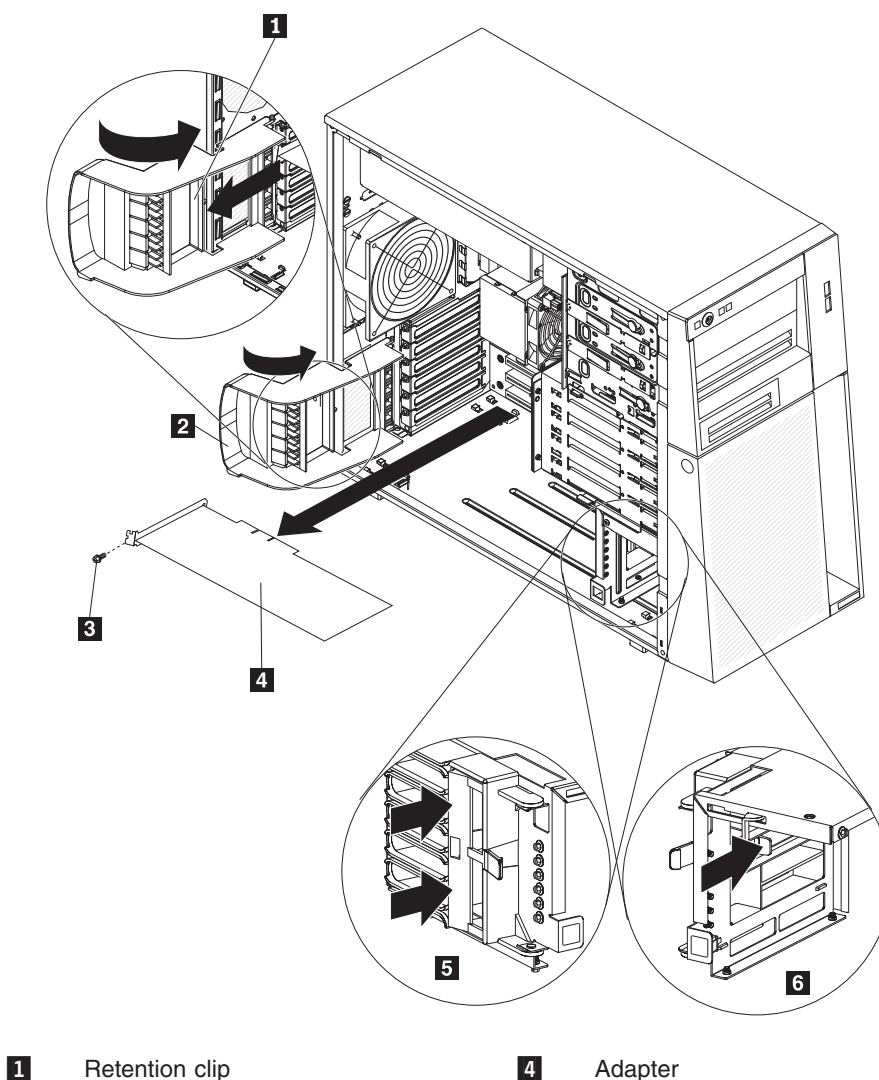
3. Install the lower bezel (see “Installing the lower bezel” on page 65).
4. Install the side cover (see “Installing the side cover” on page 63).
5. Lock the side cover.
6. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing an adapter

To remove an adapter, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Disconnect any cables to the adapter or any cables that impede access to the adapter.
5. If you are removing a full-length adapter, press on the retaining tab on the left side of the front adapter-retention bracket until the release lever on the right side of the bracket clicks into place.
6. Remove the expansion-slot screw at the rear of the adapter.
7. Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the server.

Attention: Expansion-slot covers must be installed in all empty slots. This maintains the electronic emissions standards of the server and ensures proper ventilation of server components.



- | | | | |
|----------|--------------------------------|----------|---|
| 2 | Rear adapter retention bracket | 5 | Left side of the Front adapter retention bracket |
| 3 | Expansion-slot screw | 6 | Right side of the Front adapter retention bracket |

- If you are not replacing the adapter, install an expansion-slot cover in the expansion-slot opening.
- If you are instructed to return the adapter, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an adapter

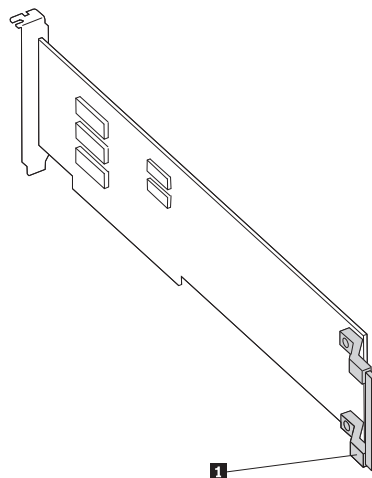
For information about the types of adapters that the server supports and other information that you might consider when you install an adapter, see the *User Guide*. For the locations of the expansion slots and optional-device connectors see “System board optional-devices connectors” on page 12.

Notes:

- If you are replacing a Remote Supervisor Adapter II SlimLine, it must be installed in its dedicated connector on the system board (see “System board optional-devices connectors” on page 12).
- When you start the server for the first time after you install a Remote Supervisor Adapter II SlimLine, the startup process will take several minutes longer than a typical startup.

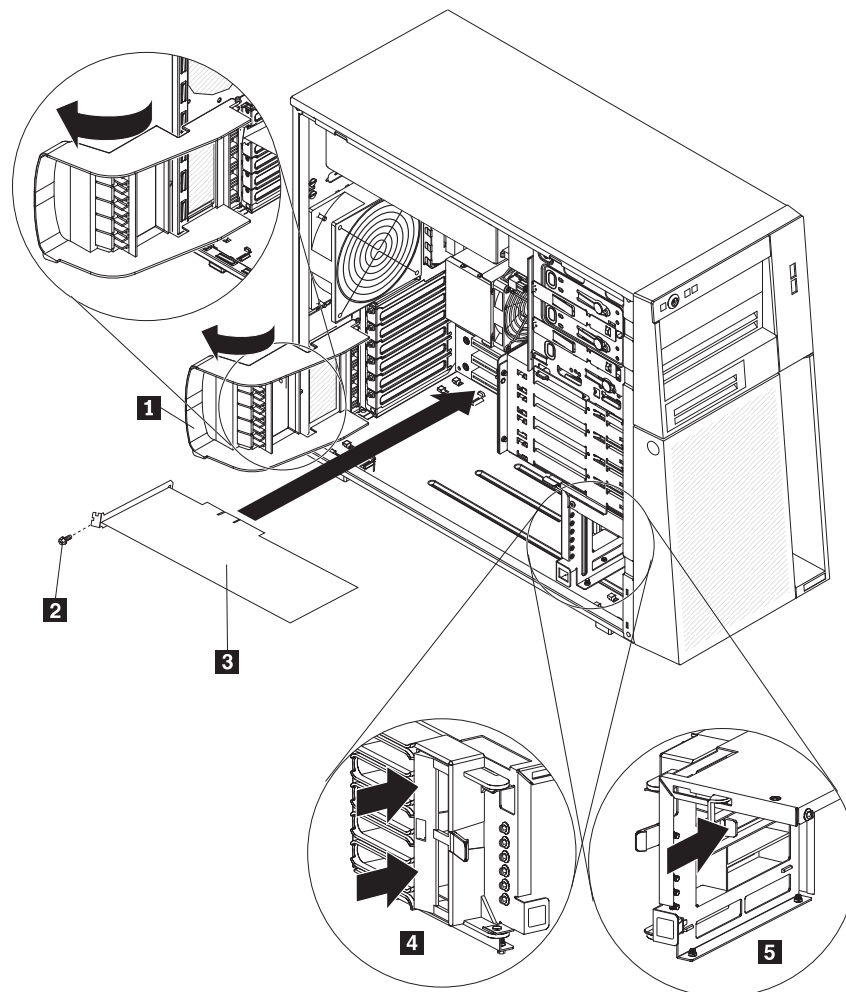
To install a replacement adapter, complete the following steps:

- Check the instructions that come with the adapter for any requirements, restrictions, or cabling instructions. It might be easier to route cables before you install the adapter.
- Follow the instructions that come with the adapter to set jumpers or switches, if any.
- Touch the static-protective package that contains the adapter to any unpainted metal surface on the server. Then, remove the adapter from the static-protective package. Avoid touching the components and gold-edge connectors on the adapter.
- If you are installing a full-length adapter, remove the blue adapter guide **1** (if any) from the end of the adapter.



- Carefully grasp the adapter by the top edge or upper corner, and move the adapter directly from the static-protective package to the expansion slot. Align

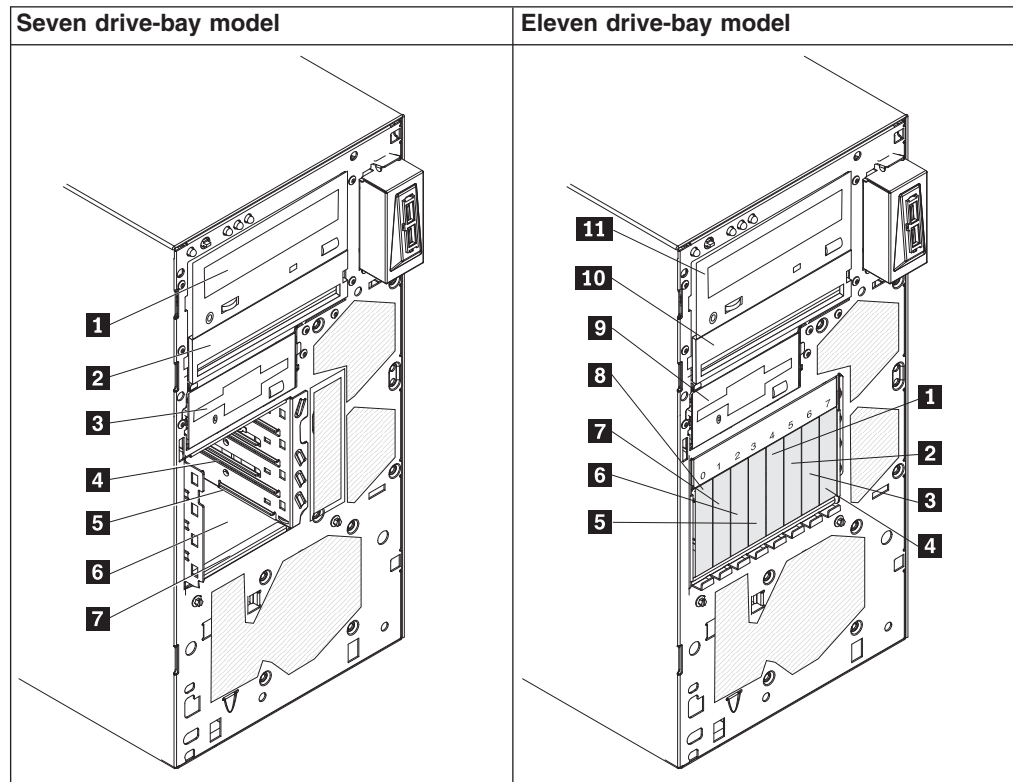
the adapter with the expansion slot guides; then, press the adapter firmly into the expansion slot. For a full-length adapter, make sure that the front edge of the adapter is correctly seated in the correct slot in the front adapter-retention bracket.



- | | | | |
|----------|--------------------------------|----------|---|
| 1 | Rear adapter retention bracket | 4 | Left side of the Front adapter retention bracket |
| 2 | Expansion-slot screw | 5 | Right side of the Front adapter retention bracket |
| 3 | Adapter | | |
6. Install an expansion-slot screw at the rear of the adapter.
 7. If you are installing a full-length adapter, press on the release lever on the right side of the front adapter-retention bracket to release the retaining tab on the left side of the bracket.
 8. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fans.
 9. Install and lock the side cover (see “Installing the side cover” on page 63).
 10. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing and installing internal drives

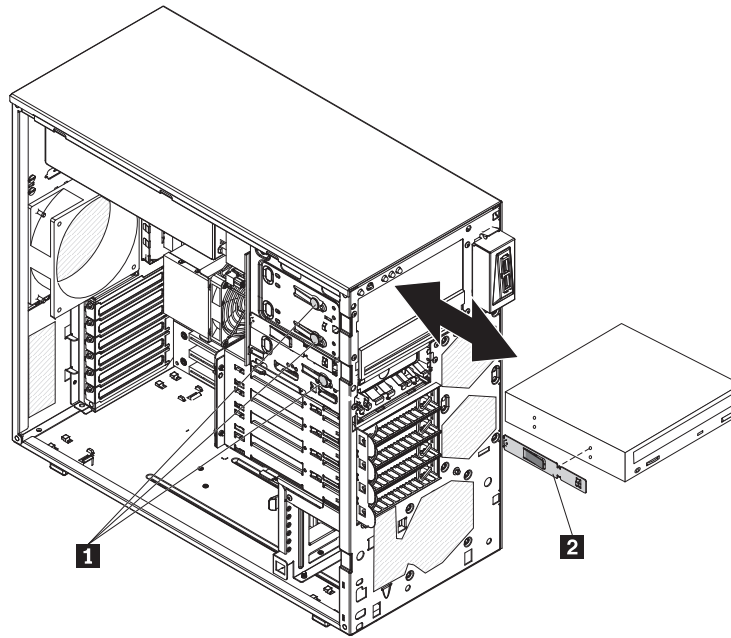
See the *User Guide* for information about the types of drives that the server supports and other important information. The following figures show the locations of the drive bays in the server. Some models have seven drive bays **1** to **7** , and some models have eleven drive bays **1** to **11** .



Removing a CD or DVD drive

To remove a CD or DVD drive, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Remove the lower bezel (see “Removing the lower bezel” on page 64).
5. Remove the upper bezel (see “Removing the upper bezel” on page 66).
6. Disconnect the power and signal cables from the drive that is to be removed.
7. Press and hold the blue release button **1** on the side of the bay to release the drive; then, pull the drive out of the front of the server.



8. Remove the drive retainer clip **2** from the side of the drive. Save the clip to use when you install the replacement drive.
9. If you are instructed to return the drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a CD or DVD drive

To install a CD or DVD drive, complete the following steps:

1. If you are replacing a removed drive with a new drive, make sure that:
 - You have all the cables and other equipment that is specified in the documentation that comes with the new drive.
 - You check the instructions that come with the new drive to determine whether you must set any switches or jumpers on the drive.
 - You have removed the drive retainer clip on the side of the old drive and have it available for installation on the new drive.

Note: If you are installing a drive that contains a laser, observe the following safety precaution.

Statement 3:



CAUTION:

When laser products (such as CD drives, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.



DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.



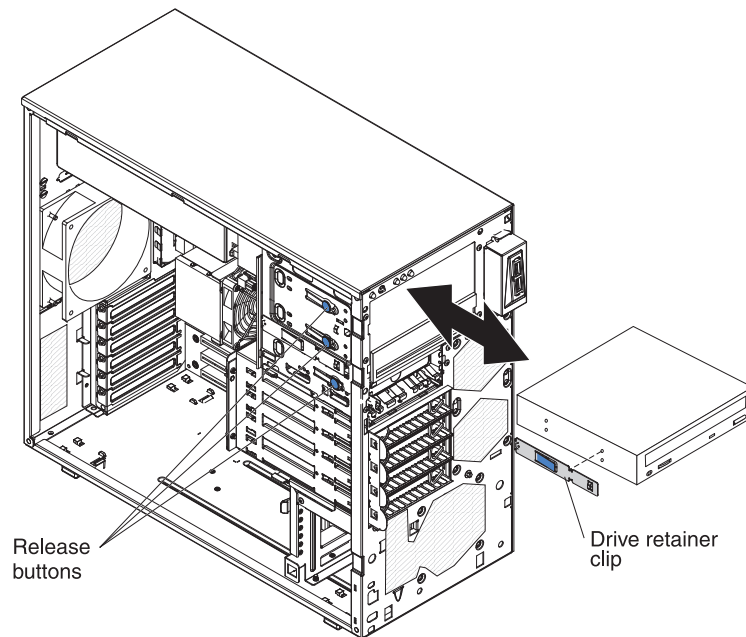
Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

2. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.

3. Follow the instructions that come with the drive to set jumpers or switches, if there are any.

Note: You might find it easier to install the new drive from the front and then attach the cables.

4. If you are installing a 3.5-inch drive in bay 2, attach a 5.25-inch conversion kit to the 3.5-inch drive. Remove the drive retainer clip from the side of the drive cage of bays 1 or 2. Slide the drive retainer clip to the right to remove it from the drive cage; then, snap the drive retainer clip into the screw holes on the side of the drive.



5. Push the drive into the bay.
6. Connect the power and signal cables to the drive.

Note: Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor and dual inline memory modules (DIMMs).

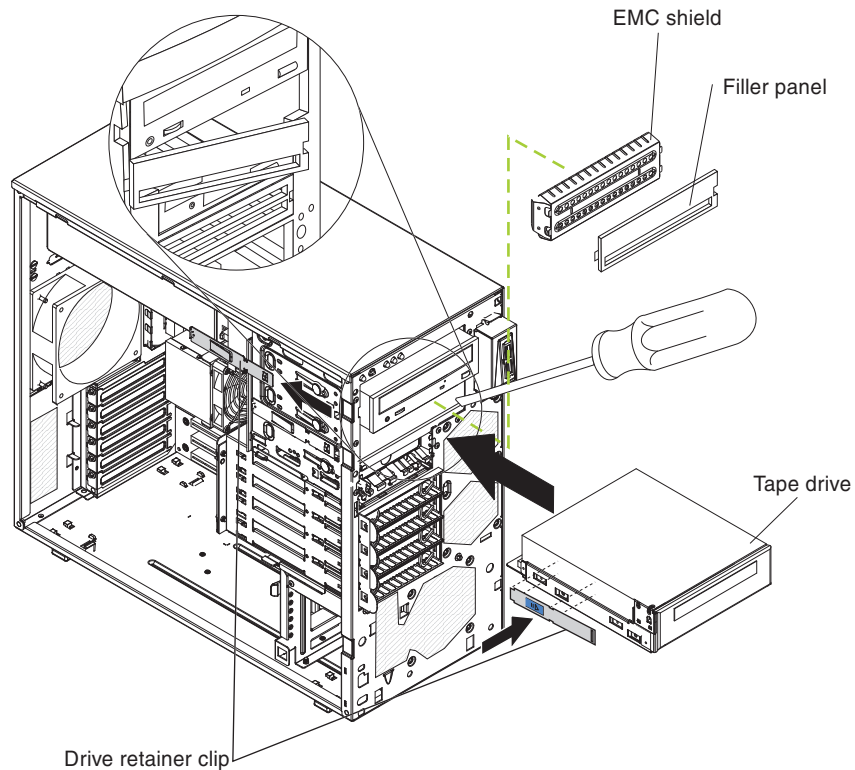
7. Install the upper bezel (see “Installing the upper bezel” on page 67).
8. Install the lower bezel (see “Installing the lower bezel” on page 65).
9. Install and lock the side cover (see “Installing the side cover” on page 63).
10. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing a tape drive

To remove a tape drive, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock and remove the side cover (see “Installing the side cover” on page 63).
4. Remove the upper bezel (see “Installing the upper bezel” on page 67).
5. Remove the lower bezel (see “Installing the lower bezel” on page 65).
6. Disconnect the power and signal cables from the drive that is to be removed.

7. Press and hold the blue release button on the side of the bay to release the drive; then, pull the drive out of the front of the server.
8. Remove the drive retainer clip from the side of the drive. Save the clip to use when you install the replacement drive.



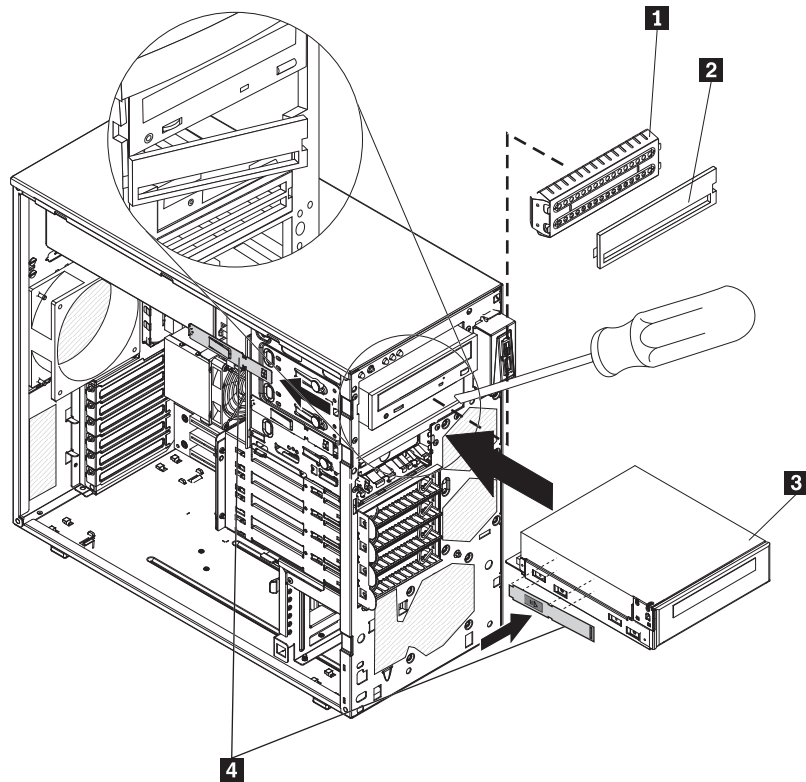
9. If you are instructed to return the drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a tape drive

To install a tape drive, complete the following steps:

1. If you are replacing a removed drive with a new drive, make sure that:
 - You have all the cables and other equipment that is specified in the documentation that comes with the new drive.
 - You check the instructions that come with the new drive to determine whether you must set any switches or jumpers on the drive.
 - You have removed the drive retainer clip on the side of the old drive and have it available for installation on the new drive.
2. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
3. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
4. Unlock and remove the side cover (see “Installing the side cover” on page 63).
5. Remove the upper bezel (see “Installing the upper bezel” on page 67).
6. Remove the lower bezel (see “Installing the lower bezel” on page 65).
7. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.

8. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
9. Remove the drive retainer clip from the side of the drive cage of bays 1 or 2. Slide the drive retainer clip to the right to remove it from the drive cage; then, snap the drive retainer clip into the screw holes on the side of the drive.



- | | | | |
|----------|--------------|----------|---------------------|
| 1 | EMC shield | 3 | Tape drive |
| 2 | Filler panel | 3 | Drive retainer clip |

10. Push the drive into the bay.

Note: A tape drive can be installed in bay 1 or bay 2

11. Connect one end of the applicable signal cable into the rear of the drive and make sure that the other end of this cable is connected into the applicable connector on the system board.
12. Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor and dual inline memory modules (DIMMs).
13. If you have another drive to install or remove, do so now.
14. Connect the power cable to the rear of the drive. The connectors are keyed and can be inserted only one way.

Removing a hot-swap hard disk drive

This procedure applies only to server models that have hot-swap hard disk drives.

Attention: To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or a filler panel installed in each drive bay.

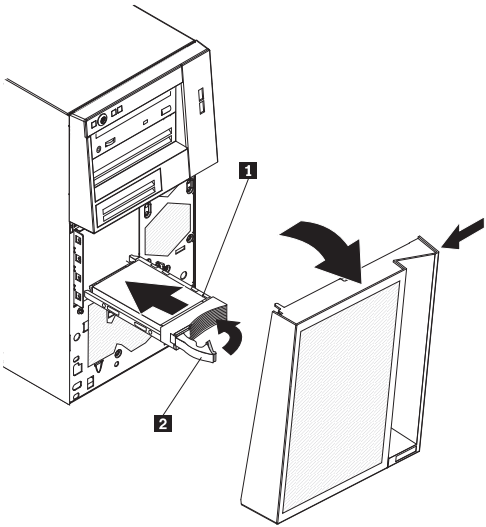
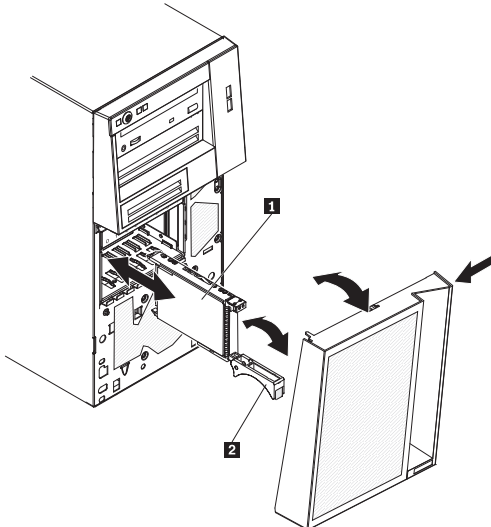
To remove a hot-swap hard disk drive, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.

Note: You do not have to turn off the server to remove hot-swap drives from the hot-swap drive bays.

2. Unlock the side cover. The side cover does not have to be removed.
3. Remove the lower bezel (see “Removing the lower bezel” on page 64).
4. Rotate the drive tray handle of the drive assembly that is to be removed to the open position (based on your model).

Table 10. Illustrations of the server models with four and eight drive bays

Server model with four hot-swap drive bays	Server model with eight hot-swap drive bays
 <p> 1 Drive-tray assembly 2 Drive tray handle (in open position) </p>	 <p> 1 Drive-tray assembly 2 Drive tray handle (in open position) </p>

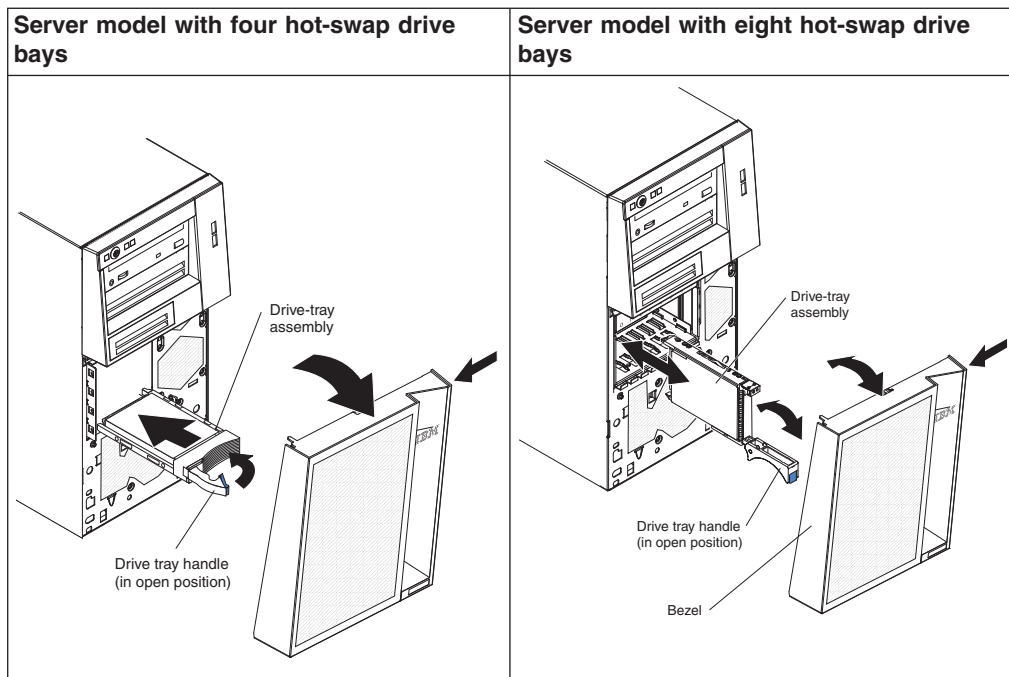
5. Grasp the handle of the drive assembly that is to be replaced and pull the assembly out of the bay.
6. If you are instructed to return the drive assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a hot-swap hard disk drive

This procedure applies only to server models that have hot-swap hard disk drives. Before you install a hot-swap hard disk drive, read the following information:

- The hot-swap drives must be either all SAS hard disk drives or all SATA hard disk drives; the two types cannot be combined.
- Inspect the drive tray for signs of damage.
- To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or a filler panel installed in each drive bay.
- You do not have to turn off the server to install hot-swap drives in the hot-swap drive bays.
- See the *User's Guide* for additional information.

To install a hot-swap hard disk drive (based on your model), complete the following steps.



1. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
2. Make sure that the drive tray handle is in the open position.
3. Align the drive assembly with the guide rails in the bay; then, carefully slide the drive assembly into the drive bay until the drive stops.
4. Rotate the drive tray handle to the closed position.
5. Check the hard disk drive status indicator to make sure that the hard disk drive is operating correctly. (You might have to restart the server for the drive to be recognized.) If the amber hard disk drive status LED for a drive is lit continuously, it indicates that the drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, this indicates that the drive is being accessed.

Note: If the server is configured for RAID operation using a ServeRAID controller, you might have to reconfigure the disk arrays after you replace hard disk drives. See the ServeRAID documentation for additional information about RAID operation and complete instructions for using ServeRAID Manager.

6. Install the lower bezel (see “Installing the lower bezel” on page 65).
7. Lock the side cover.

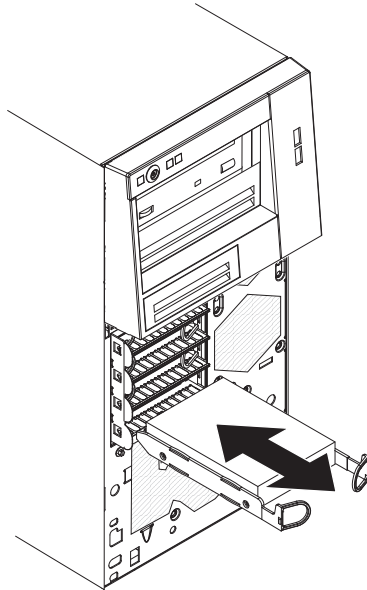
Removing a simple-swap hard disk drive

This procedure applies only to server models that have simple-swap SATA hard disk drives.

Attention: Simple-swap hard disk drives are not hot-swappable. Disconnect all power from the server before you remove or install a simple-swap hard disk drive.

To remove a simple-swap hard disk drive, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock the side cover. The side cover does not have to be removed.
4. Remove the lower bezel (see “Removing the lower bezel” on page 64).
5. Pull the loops of the drive assembly that is to be removed toward each other; then, pull the assembly out of the bay.



6. If you are instructed to return the drive assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

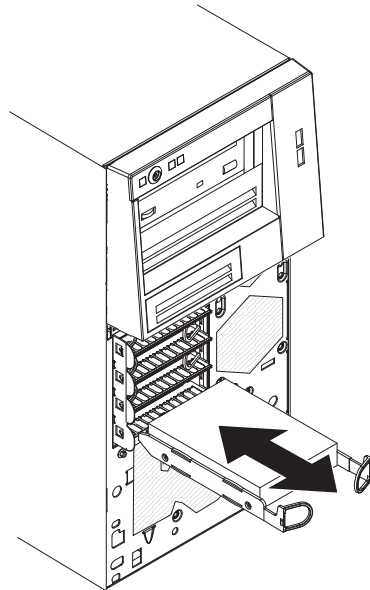
Installing a simple-swap hard disk drive

This procedure applies only to server models that have simple-swap SATA hard disk drives. See the *User Guide* for information about the installation sequence and other important information.

Attention: Simple-swap hard disk drives are not hot-swappable. Disconnect all power from the server you remove or install a simple-swap hard disk drive.

To install a simple-swap hard disk drive, complete the following steps:

1. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
2. Align the drive assembly with the guide rails in the bay.



3. Pull the loops of the drive assembly toward each other; then, carefully slide the drive assembly into the drive bay until it stops, and release the loops.

Note: Do not release the loops on the drive assembly until it is completely seated.

4. Install the lower bezel (see “Installing the lower bezel” on page 65).
5. Lock the side cover.
6. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing a hot-swap power supply

This procedure applies only to server models that have hot-swap power supplies. See “Removing a non-hot-swap power supply” on page 115 for information about the removal of a non-hot-swap power supply.

When you remove or install a hot-swap power supply, observe the following precautions.

Statement 8:



CAUTION:

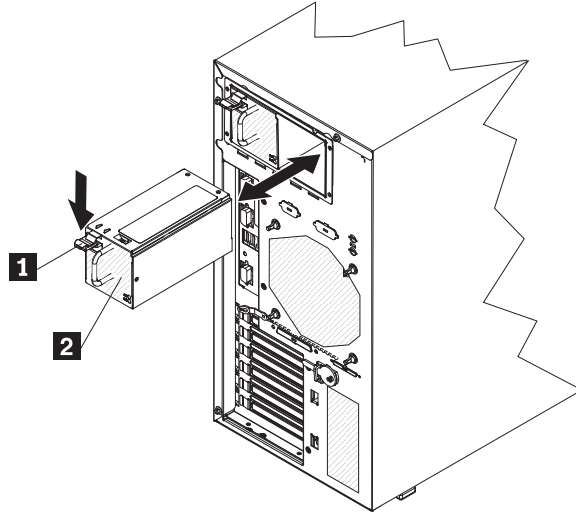
Never remove the cover on a power supply or any part that has the following label attached.



Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

To remove a hot-swap power supply, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Disconnect the power cord from the power supply that is to be removed.
3. Press down on the orange release lever **1** and pull the power supply **2** out of the bay, using the handle.



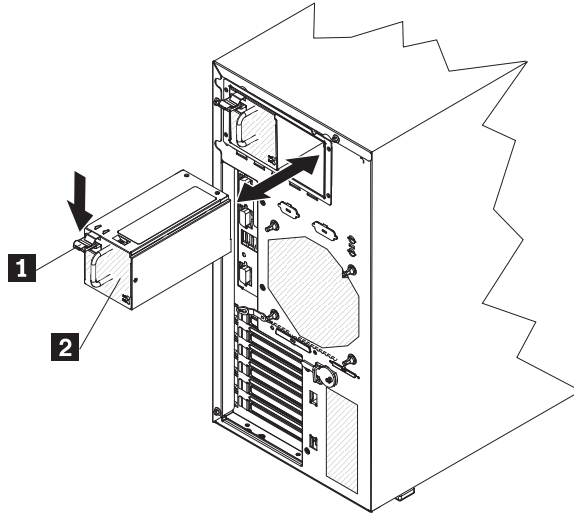
4. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a hot-swap power supply

This procedure applies only to server models that have hot-swap power supplies. See “Installing a non-hot-swap power supply” on page 117 for information about the installation of a non-hot-swap power supply.

To install a hot-swap power supply, complete the following steps:

1. Place the power supply into the bay guides.



- 1** Release lever
- 2** Hot-swap power supply

2. Using the handle, push the power supply toward the front of the chassis until it locks into place.
3. Connect one end of the power cord into the connector on the back of the power supply and connect the other end of the power cord into a properly grounded electrical outlet.
4. Make sure that both the ac and dc power LEDs on the rear of the power supply are lit, indicating that the power supply is operating correctly.

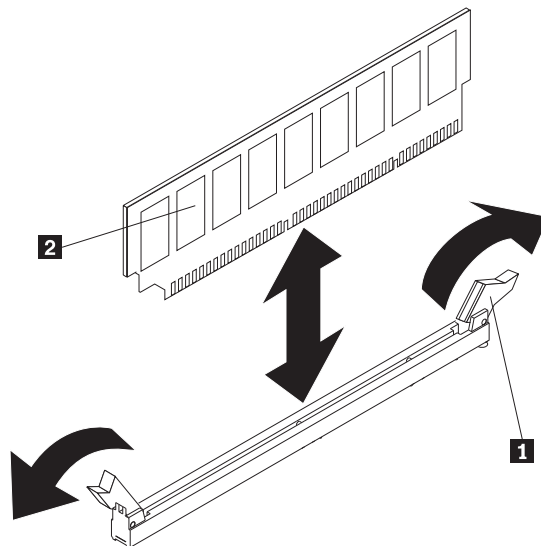
Removing a memory module

To remove a dual inline memory module (DIMM), complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Disconnect any cables that impede access to the DIMMs.
5. Locate the DIMM connector that contains the DIMM that is to be replaced (see “System board optional-devices connectors” on page 12 for DIMM slot locations).

Attention: To avoid breaking the DIMM retaining clips or damaging the DIMM connectors, open and close the clips gently.

6. Carefully open the retaining clips **1** on each end of the DIMM **2** connector and remove the DIMM.



7. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

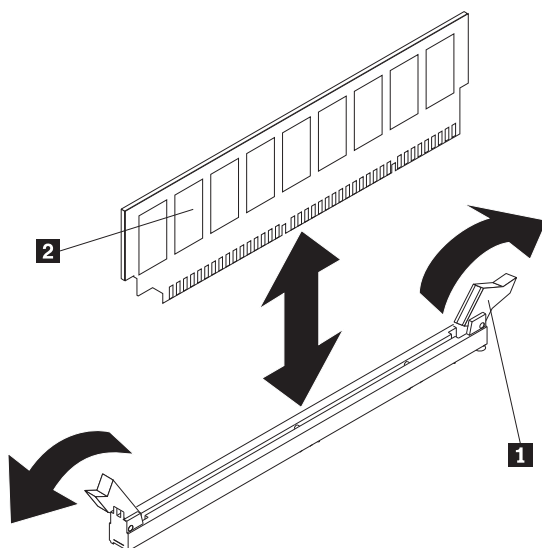
Installing a memory module

Note: If you are replacing a faulty DIMM, make sure that the replacement DIMM is the correct type of memory. If you are adding DIMMs, install the DIMMs in the sequence shown in the following table. See the *User Guide* for additional information about the type of memory that is compatible with the server.

Number of DIMMs	Connectors
One DIMM	1
Two DIMMs	1, 3
Three DIMMs	Not supported
Four DIMMs	1, 3, 2, 4

To install a DIMM, complete the following steps:

1. Make sure that the retaining clips on each end of the DIMM connector are fully open.
2. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the server; then, remove the new DIMM from the package.
3. Turn the DIMM so that the DIMM keys align correctly with the connector.
Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
4. Insert the DIMM **2** into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips **1** snap into the locked position when the DIMM is firmly seated in the connector. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. Open the retaining clips, remove the DIMM, and then reinsert it.



5. Reconnect any cables that you disconnected during removal.
6. Install the side cover (see "Installing the side cover" on page 63).
7. Lock the side cover if you unlocked it during removal.
8. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing and replacing optional-service CRUs

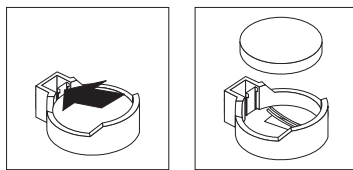
You may install an optional-service CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for the server.

The illustrations in this document might differ slightly from your hardware.

Removing the battery

To remove the battery, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Remove any adapters that impede access to the battery.
5. Locate the battery on the system board (see “System board internal connectors” on page 10).
6. Remove the battery:
 - a. Use a fingernail to press the top of the battery clip away from the battery. The battery pops up when it is released.



- b. Use your thumb and index finger to lift the battery from the socket.

Installing the battery

The following notes describe information that you must consider when you replace the battery in the server.

- You must replace the battery with a lithium battery of the same type from the same manufacturer.
- To order replacement batteries in U.S. and Canada, call Lenovo Service and Support. Outside the U.S. and Canada, call your Lenovo marketing representative or authorized reseller.
- After you replace the battery, you must reconfigure the server and reset the system date and time.
- To avoid possible danger, read and follow the following safety statement.

Statement 2:



CAUTION:

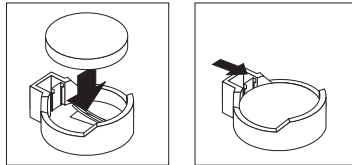
When replacing the lithium battery, use only the battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

To install the battery, complete the following steps:

1. Follow any special handling and installation instructions that come with the replacement battery.
2. Insert the new battery:
 - a. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.



- b. Press the battery down into the socket until it clicks into place. Make sure that the battery clip holds the battery securely.
3. Install the side cover (see “Installing the side cover” on page 63).
 4. Lock the side cover if you unlocked it during removal.
 5. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.
 6. Start the Configuration/Setup Utility program and reset the configuration:
 - Set the system date and time.
 - Set the power-on password.
 - Reconfigure the server.

See “Using the Configuration/Setup Utility program” on page 19 for details.

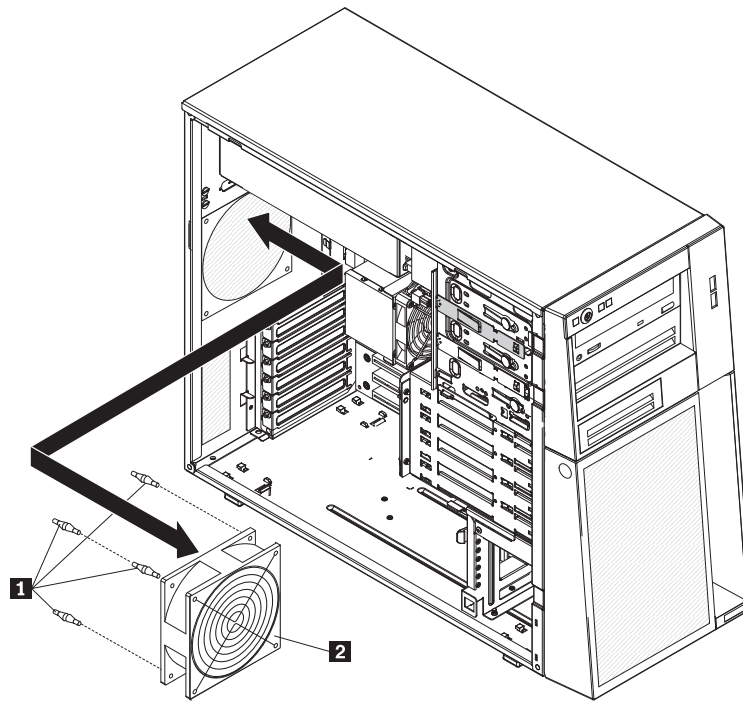
Removing the rear system fan

Attention:

- Replace a failed fan within 48 hours.
- To ensure proper cooling and airflow, do not operate the server for more than 30 minutes with the side cover removed.

To remove the rear system fan, complete the following steps:

1. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
2. Unlock and remove the side cover (see “Removing the side cover” on page 62).
3. Remove any adapters that impede access to the fan and the fan connector on the system board (see “Removing an adapter” on page 68).
4. Disconnect the fan cable from the system board, making a note of where the cable was connected, for later installation.
5. Grasp the fan **2** with both hands and pull firmly, extending the rubber grommets **1**. The grommets will be pulled through the holes in either the fan or the chassis and can then be removed.



6. Pull the fan up and out of the chassis.
7. If you are instructed to return the fan, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

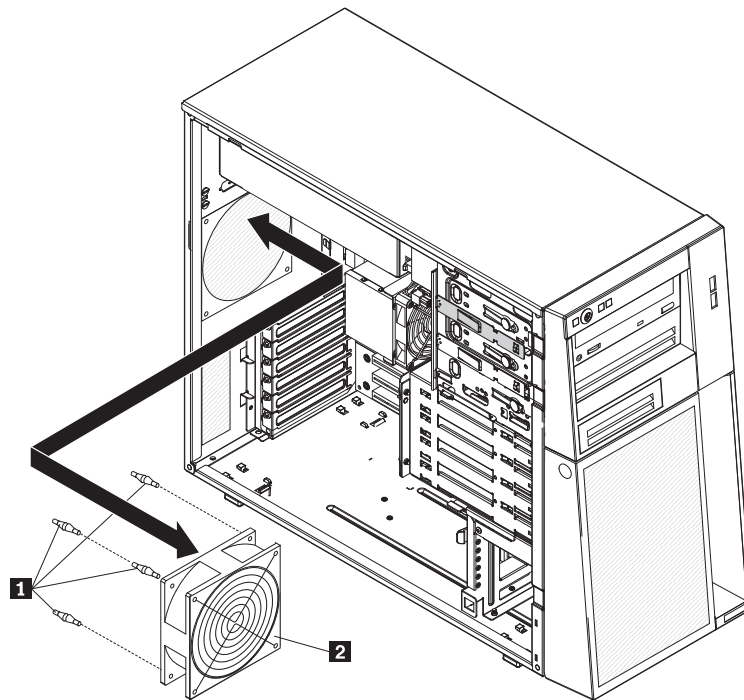
Installing the rear system fan

Attention:

- Replace a failed fan within 48 hours.
- To ensure proper cooling and airflow, do not operate the server for more than 30 minutes with the side cover removed.

To install the rear system fan, complete the following steps:

1. The replacement fan **2** comes with the rubber grommets **1** installed; however, they might have come out during shipment. If any of the rubber grommets are missing from the fan, install them on the fan before you continue. Use needle-nosed pliers to pull the grommets through the holes in the fan.
2. Position the fan so that the grommets protrude through the holes in the chassis; then, use needle-nosed pliers to pull the grommets through the holes from outside the chassis.



3. Connect the fan cable to the system board (see “System board internal connectors” on page 10 for the location of the rear fan connector).
4. Install any adapters that you removed (see “Installing an adapter” on page 69).
5. Install the side cover (see “Installing the side cover” on page 63).
6. Lock the side cover if you unlocked it during removal.
7. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the hard disk drive fan assembly

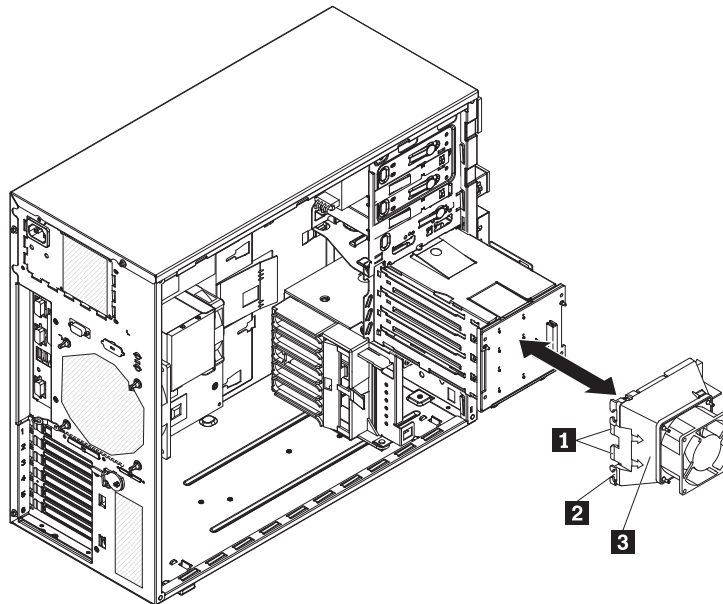
This procedure applies only to server models that have a hard disk drive fan assembly.

Attention:

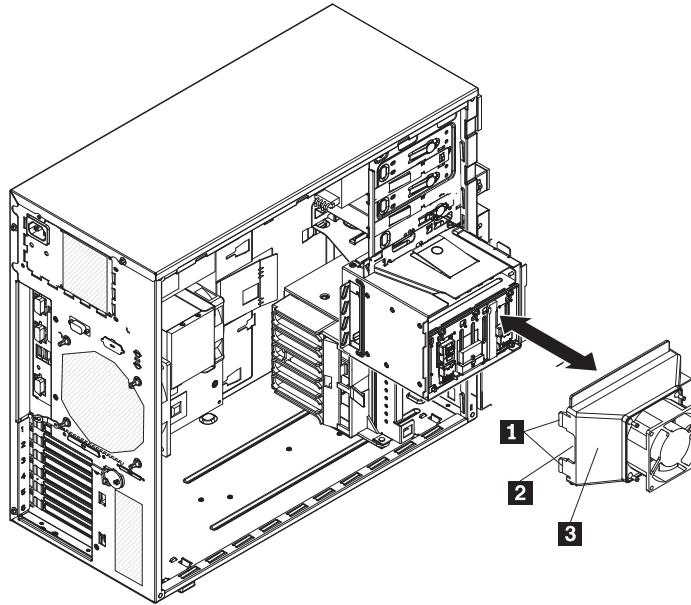
- Replace a failed fan within 48 hours.
- To ensure proper cooling and airflow, do not operate the server for more than 30 minutes with the side cover removed.

To remove the hard disk drive fan assembly, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Disconnect the hard disk drive fan assembly **3** cable from the system board, making a note of where the cable was connected for later installation.
5. Remove the hard disk drives.
6. Press and hold the drive cage release tab; then, rotate the drive cage out of the chassis until the retaining tab on top of the cage locks into place.
7. Pull out on the hard disk drive fan assembly release tabs **1**; then, rotate the assembly away from the drive cage slightly.



If you have the eight-drive, 2.5-inch hot-swap hard disk drive model, the hard disk drive fan assembly looks like the following illustration.



8. Remove the cable from the slot **2** on the hard disk drive fan assembly; then, rotate the assembly away from the drive cage and remove the assembly from the drive cage.
9. If you are instructed to return the hard disk drive fan assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the hard disk drive fan assembly

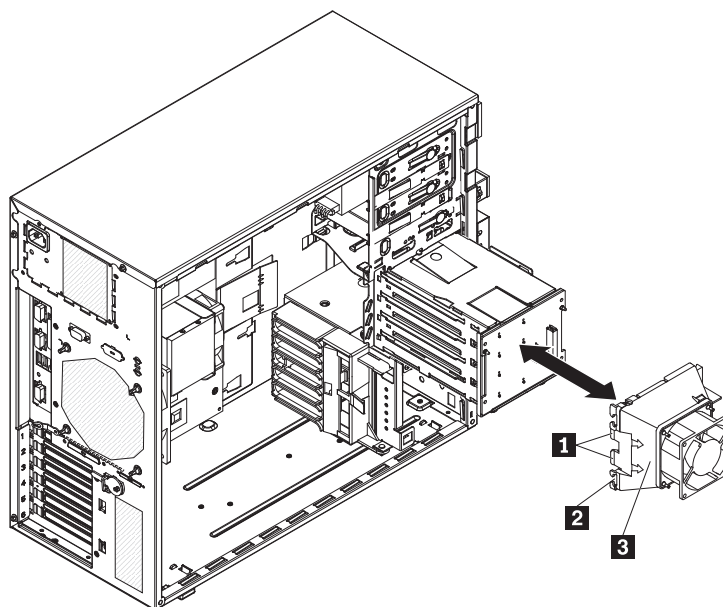
This procedure applies only to server models that have a hard disk drive fan assembly.

Attention:

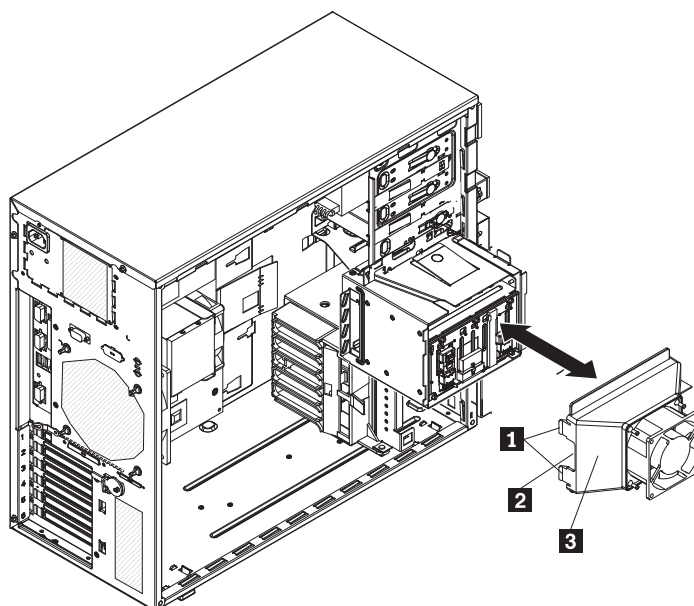
- Replace a failed fan within 48 hours.
- To ensure proper cooling and airflow, do not operate the server for more than 30 minutes with the side cover removed.

To install the hard disk drive fan assembly, complete the following steps:

1. Insert the hard disk drive fan assembly retaining tab **1** over the right edge of the hard disk drive backplane; then, rotate the fan assembly toward the backplane. Do not fully close the hard disk drive fan assembly **3**.



If you have the eight-drive, 2.5-inch hot-swap hard disk drive model, the hard disk drive fan assembly looks like the following illustration.



2. Route the hard disk drive signal and power cables through the slots **2** on the edge of the hard disk drive fan assembly **3**. Make sure that the cables will not be pinched between the hard disk drive assembly and the hard disk drive backplane when the assembly is installed.
3. Rotate the hard disk drive fan assembly toward the backplane until the release tabs are fully engaged on the drive cage.
4. Rotate the drive cage toward the front of the server until it stops; then, press and hold the retaining tab on top of the drive cage while you rotate the drive cage into the chassis until it locks into place.
5. Connect the hard disk drive fan assembly cable to the system board (see “System board internal connectors” on page 10 for the location of the hard disk drive fan connector).
6. Reinstall the hard disk drives.

Note: Before you continue, check all internal power cables to be sure that they are connected to the system board and other optional devices.

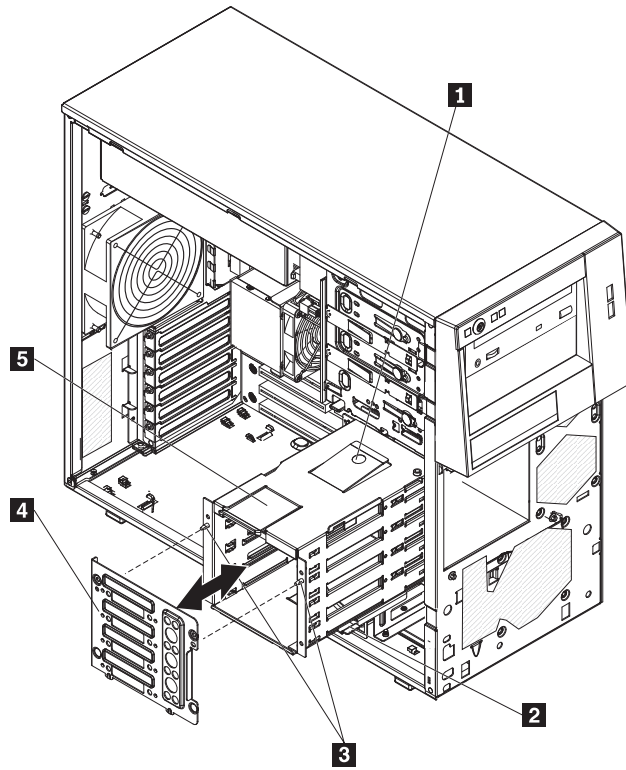
7. Install the side cover (see “Installing the side cover” on page 63).
8. Lock the side cover if you unlocked it during removal.
9. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the simple-swap backplate

This procedure applies only to server models with the simple-swap SATA backplate installed on the back of the hard disk drive cage.

To remove the simple-swap backplate, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Remove the lower bezel (see “Removing the lower bezel” on page 64).
5. Remove the simple-swap hard disk drives that are installed in the hard disk drive cage (see “Removing a simple-swap hard disk drive” on page 79).
6. Remove the hard disk drive fan assembly from the hard disk drive cage (see “Removing the hard disk drive fan assembly” on page 90).
7. Disconnect the power cables from the simple-swap backplate.
8. Disconnect the signal cables from the system board.
9. Press and hold the drive cage release tab **2**; then, rotate the drive cage out of the chassis until the retaining tab **1** on top of the cage locks into place.
10. Lift up on the retaining latch **5** at the top of the drive cage; then, tilt the top of the simple-swap backplate **4** away from the drive cage until it is clear of the locating pins **3**.



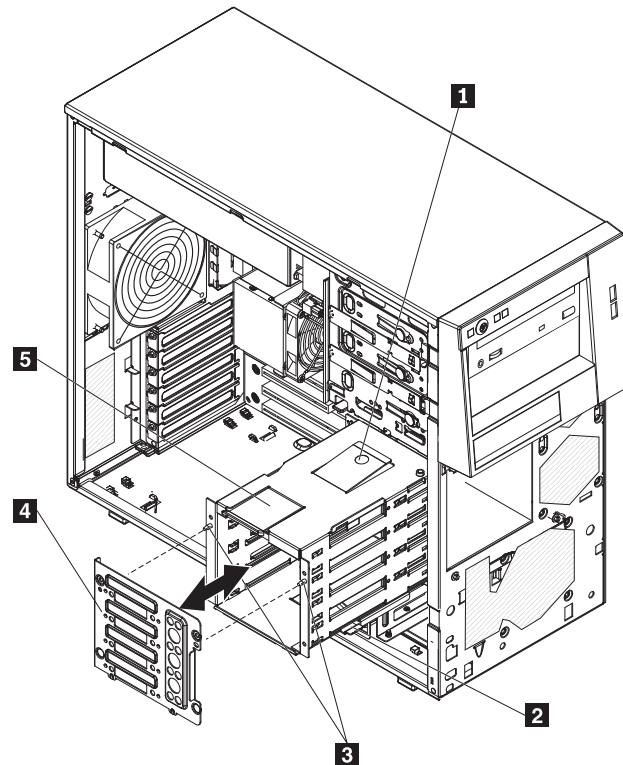
11. Lift the simple-swap backplate out of the lower lip on the drive cage and set it aside.
12. If you are instructed to return the simple-swap backplate, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the simple-swap backplate

This procedure applies only to server models with the simple-swap SATA backplate installed on the back of the hard disk drive cage.

To install the simple-swap backplate, complete the following steps.

1. Position the bottom edge of the simple-swap backplate **4** on the lower lip of the drive cage.



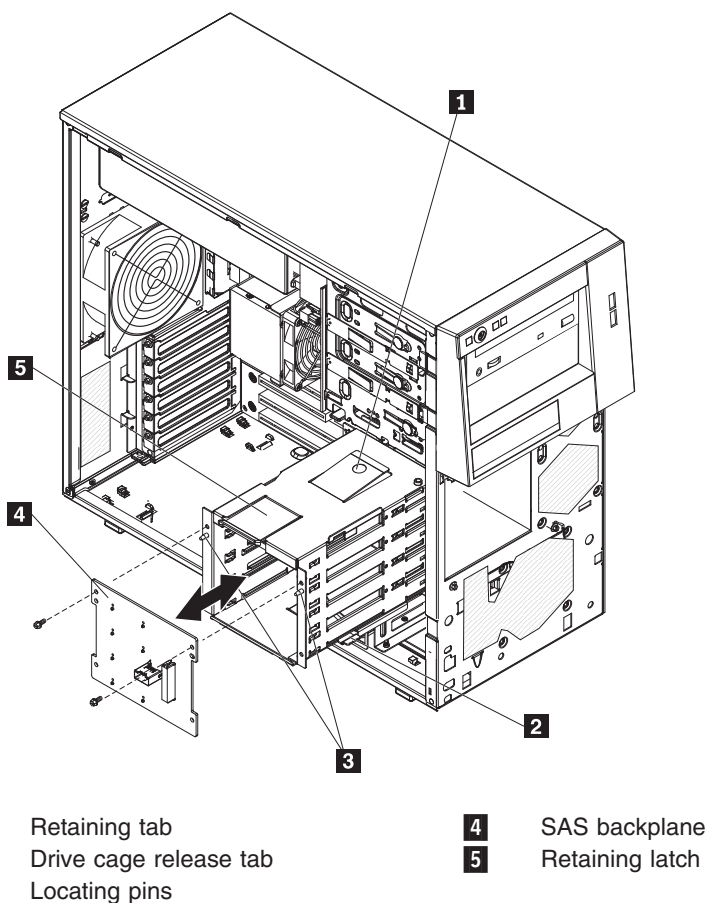
2. Tilt the top of the simple-swap backplate toward the drive cage and over the locating pins **3** until the retaining latch **5** is engaged securely.
3. Press and hold the retaining tab **1** on top of the cage; then, rotate the drive cage into the chassis until it locks into place.
4. Connect the signal cables to the system board (see “System board internal connectors” on page 10 for the location of the Serial ATA drive connectors).
5. Connect the power cables to the simple-swap backplate.
6. Install the hard disk drive fan assembly on the hard disk drive cage (see “Installing the hard disk drive fan assembly” on page 92).
7. Install the simple-swap hard disk drives that you removed from the hard disk drive cage (see “Installing a simple-swap hard disk drive” on page 80).
8. Install the lower bezel (see “Installing the lower bezel” on page 65).
9. Install the side cover (see “Installing the side cover” on page 63).
10. Lock the side cover if you unlocked it during removal.
11. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the SAS/SATA hard disk drive backplane

This procedure applies only to hot-swap server models with a SAS/SATA hard disk drive backplane installed on the back of the hard disk drive cage.

To remove the SAS/SATA hard disk drive backplane, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Remove the lower bezel (see “Removing the lower bezel” on page 64).
5. Remove the hot-swap SAS/SATA hard disk drives installed in the hard disk drive cage (see “Removing a hot-swap hard disk drive” on page 76).
6. Remove the hard disk drive fan assembly from the hard disk drive cage (see “Removing the hard disk drive fan assembly” on page 90).
7. Disconnect the power and signal cables from the hard disk drive backplane.
8. Press and hold the drive cage release tab; then, rotate the drive cage out of the chassis until the retaining tab on top of the cage locks into place.
9. Remove the two screws that secure the SAS/SATA hard disk drive backplane to the drive cage.



10. Tilt the top of the hard disk drive backplane away from the drive cage until it is clear of the locating pins.

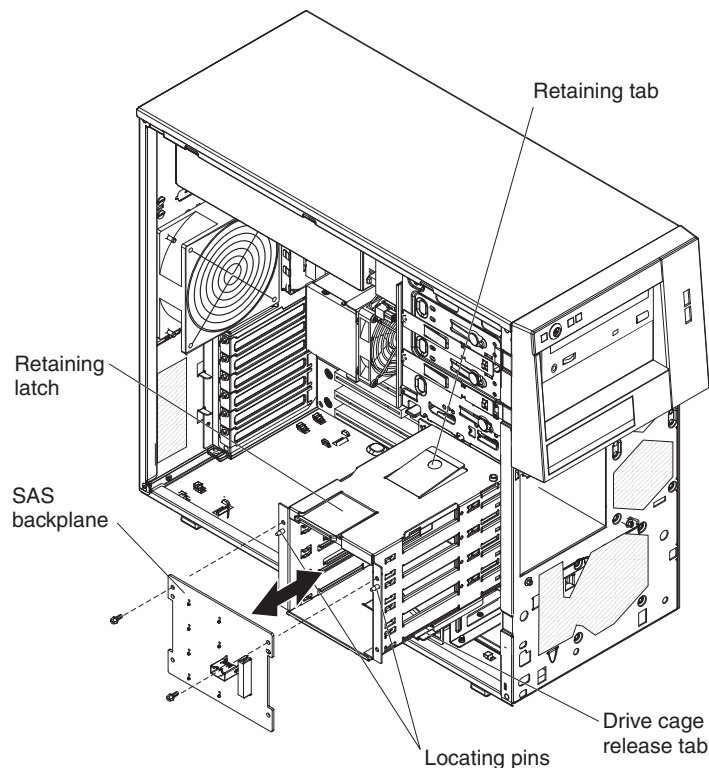
11. Lift the SAS/SATA hard disk drive backplane out of the lower lip on the drive cage and set it aside.
12. If you are instructed to return the SAS/SATA hard disk drive backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the SAS/SATA hard disk drive backplane

This procedure applies only to hot-swap server models with a SAS/SATA hard disk drive backplane installed on the back of the hard disk drive cage.

To install the hard disk drive backplane, complete the following steps:

1. Place the bottom edge of the SAS/SATA hard disk drive backplane in the lower lip of the drive cage.
2. Tilt the top of the SAS/SATA hard disk drive backplane toward the drive cage and over the locating pins.



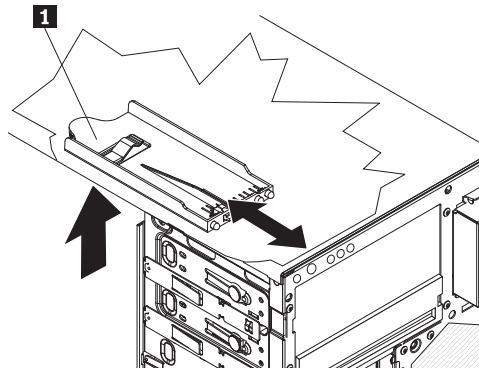
3. Install the two screws that secure the SAS/SATA hard disk drive backplane to the drive cage.
4. Press and hold the retaining tab on top of the cage; then, rotate the drive cage into the chassis until it locks into place.
5. Connect the power and signal cables to the hard disk drive backplane.
6. Install the hard disk drive fan assembly onto the hard disk drive cage (see "Installing the hard disk drive fan assembly" on page 92).
7. Install the hot-swap hard disk drives that you removed from the hard disk drive cage (see "Installing a hot-swap hard disk drive" on page 77).
8. Install the lower bezel (see "Installing the lower bezel" on page 65).
9. Install the side cover (see "Installing the side cover" on page 63).
10. Lock the side cover if you unlocked it during removal.

11. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the front-panel assembly

To remove the front-panel assembly, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Remove the lower bezel (see “Removing the lower bezel” on page 64).
5. Remove the upper bezel (see “Removing the upper bezel” on page 66).
6. Slide the drives in bay 1 and bay 2 forward slightly (see “Removing a CD or DVD drive” on page 72 for more information). It is not necessary to remove these drives.
7. If the server has hot-swap power supplies, remove the power supplies and the power supply cage (see “Removing the hot-swap power supply cage” on page 104).
8. Disconnect the front-panel assembly cable from the system board, and note the routing of the cable (see “System board internal connectors” on page 10 for the location of the front-panel connector).
9. Press up on the release tab **1** of the front-panel assembly and pull the assembly toward the rear of the server; then, remove the front-panel assembly from the chassis.

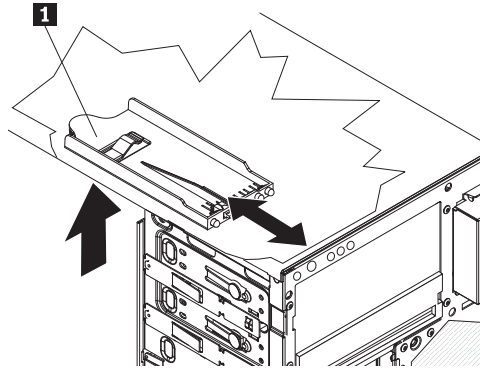


10. If you are instructed to return the front-panel assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the front-panel assembly

To install the front-panel assembly, complete the following steps:

1. Position the front end of the front-panel assembly in the channel above drive bay 1 on the left side of the chassis.

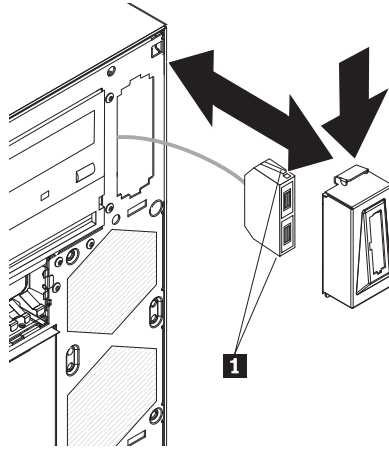


2. Push the front-panel assembly toward the front of the chassis until it clicks into place.
3. Reroute and connect the front-panel assembly cable to the system board (see “System board internal connectors” on page 10 for the location of the front-panel connector).
4. If the server has hot-swap power supplies, install the power supply cage and the power supplies (see “Installing the hot-swap power supply cage” on page 105).
5. Push the drives in bay 1 and bay 2 into the drive bays (see “Installing a CD or DVD drive” on page 73 for more information).
6. Install the upper bezel (see “Installing the upper bezel” on page 67).
7. Install the lower bezel (see “Installing the lower bezel” on page 65).
8. Install the side cover (see “Installing the side cover” on page 63).
9. Lock the side cover if you unlocked it during removal.
10. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the front USB connector assembly

To remove the front USB connector assembly, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Remove the lower bezel (see “Removing the lower bezel” on page 64).
5. Remove the upper bezel (see “Removing the upper bezel” on page 66).
6. Disconnect the front USB cable from the system board, and note the routing of the cable (see “System board internal connectors” on page 10 for the location of the front USB connector).
7. Press down and hold the release tab on the top of the front USB housing; then, tilt the top of the housing away from the chassis and lift the housing out of the opening in the chassis.



8. Squeeze the spring clips **1** on the sides of the front USB connector assembly and pull the assembly out of the back of the housing.
9. Carefully pull the front USB cable out of the opening in the chassis.
10. If you are instructed to return the front USB connector assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

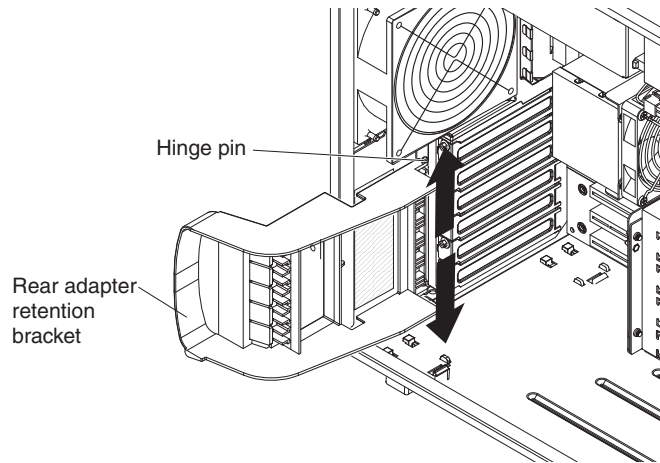
Removing the rear adapter retention bracket

To remove the rear adapter-retention bracket, complete the following steps:

1. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
2. Unlock and remove the side cover (see “Removing the side cover” on page 62).
3. Remove all adapters (if necessary) and place the adapters on static-protective surface.

Note: You might find it helpful to note where each adapter is installed before you remove the adapters.

4. Release the rear adapter-retention bracket by lifting up on the rear adapter-retention bracket, and rotate the bracket partially toward the closed position.
5. Grasp the bracket on one side at the hinge point and pull outward (while you rotate the bracket slightly toward the front of the server) until the bracket is free of the hinge pin; then, grasp the bracket on the other side at the hinge point, pull outward until the bracket is free of the hinge pin, and remove the rear adapter-retention bracket from the server.



6. If necessary, remove the Remote Supervisor Adapter II SlimLine retention tab and store it for future use.

Installing the rear adapter retention bracket

To install the rear adapter-retention bracket, complete the following steps:

1. If you removed the Remote Supervisor Adapter II SlimLine retention tab earlier, reinstall it on the rear adapter-retention bracket and any other adapters that you might have removed.
2. Position the rear adapter retention bracket so that the hole in one of the hinge points is aligned with the hinge pin on the chassis; then, place the hinge pin through the hole on the chassis.
3. Rotate the rear adapter-retention bracket into place so that the hole in the opposite hinge point snaps into place over the hinge pin on the chassis.
4. Install the side cover (see “Installing the side cover” on page 63).
5. Lock the side cover if you unlocked it during removal.
6. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the front adapter-retention bracket

To remove the front adapter-retention bracket, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Open the front and rear adapter-retention brackets.
5. Remove all adapters (if necessary) and place them on a static-protective surface.

Note: You might find it helpful to note where each adapter is installed before you remove the adapters.

6. Grasp one side of the bracket at a hinge point and pull outward (while you rotate the bracket slightly toward the rear of the server) until the hinge pin on the bracket is free of the hole; then, grasp the bracket on the other side at the hinge point, pull outward until the bracket is free of the hinge pin, and remove the rear adapter-retention bracket from the server.

Installing the front adapter-retention bracket

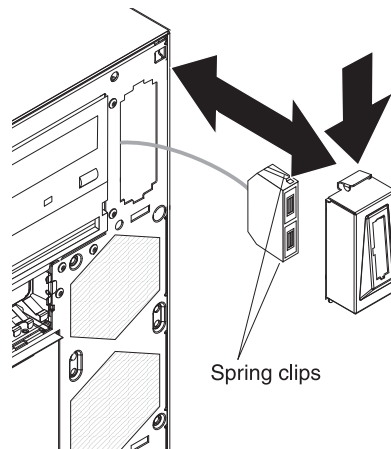
To install the front adapter-retention bracket, complete the following steps:

1. Insert one of the hinge pins on the front adapter-retention bracket into the metal hinge point on the fan cage assembly.
2. Rotate the other hinge pin on the front adapter-retention bracket into position and push the hinge pin into the other metal hinge point. The hinge pin will protrude through the hole in the metal hinge point when the adapter-retention bracket is seated correctly.
3. Reinstall any adapters that you removed earlier.
4. Close the front and rear adapter retention brackets.
5. Install the side cover (see “Installing the side cover” on page 63).
6. Lock the side cover.
7. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Installing the front USB connector assembly

To install the front USB connector assembly, complete the following steps:

1. Carefully insert the front USB cable through the opening in the front of the chassis.



2. Squeeze the spring clips on the sides of the front USB connector assembly and insert the assembly into the housing through the back of the housing.
3. Place the bottom edge of the housing into the bottom of the opening in the chassis; then, tilt the top of the housing into position until it clicks into place.
4. Reroute and connect the front USB cable to the system board (see “System board internal connectors” on page 10 for the location of the front USB connector).
5. Install the upper bezel (see “Installing the upper bezel” on page 67).
6. Install the lower bezel (see “Installing the lower bezel” on page 65).
7. Install the side cover (see “Installing the side cover” on page 63).
8. Lock the side cover if you unlocked it during removal.
9. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the hot-swap power supply cage

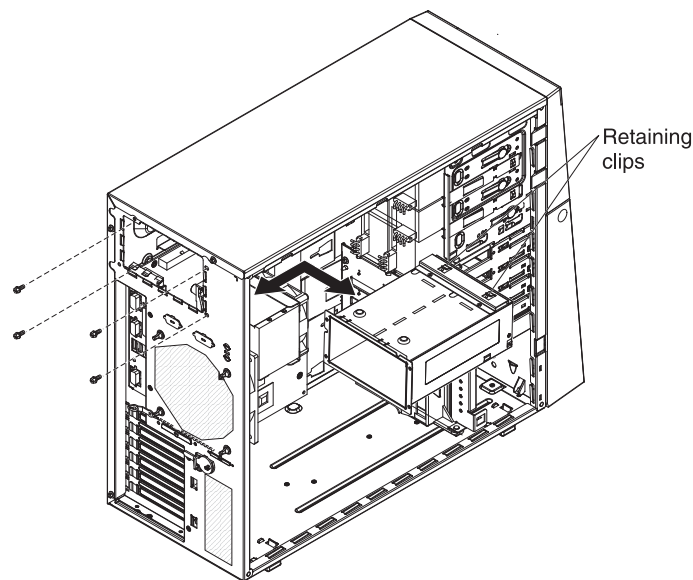
This procedure applies only to server models that have hot-swap power-supplies.

To remove the power supply cage, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Remove both hot-swap power supplies (see “Removing a hot-swap power supply” on page 81).

Note: It might be helpful to lay the server on its side for the remainder of this procedure.

5. Disconnect the cables from the power supply cage to the system board and all internal components.
6. Remove the four screws that secure the power supply cage to the chassis; then, slide the cage toward the front of the server to disengage the retaining clips from the top of the chassis and lift the cage out of the chassis.



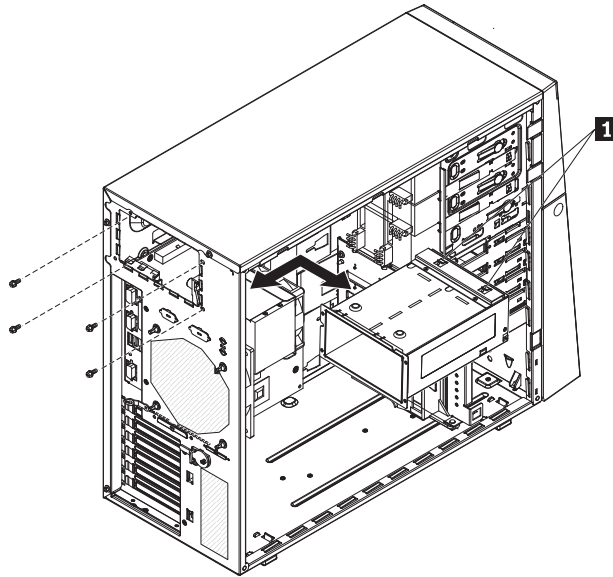
7. If you are instructed to return the power supply cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the hot-swap power supply cage

This procedure applies only to server models that have hot-swap power-supplies.

To install the hot-swap power supply cage, complete the following steps:

1. Place the power supply cage into the chassis and slide it toward the rear of the server until the retaining clips **1** engage the top of the chassis.

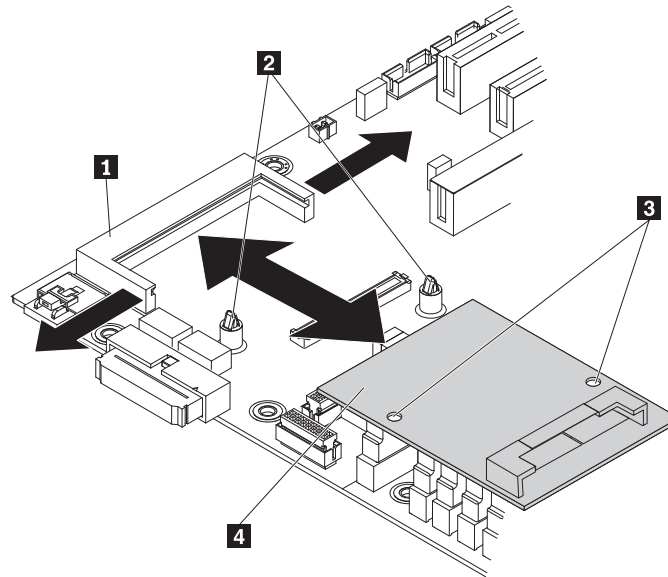


2. Install the four screws that secure the power supply cage to the chassis.
3. Connect the cables from the power supply cage to the system board and all internal components.
4. Reinstall both hot-swap power supplies (see “Installing a hot-swap power supply” on page 83).
5. Install the side cover (see “Installing the side cover” on page 63).
6. Lock the side cover if you unlocked it during removal.
7. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the mini-SAS/SATA controller

To remove the mini-SAS/SATA RAID controller, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Open the rear adapter-retention bracket until the release lever on the right side of the bracket clicks into place.
5. Squeeze the tabs on both sides of the connector on the signal cable and remove the cable from the SAS/SATA controller .



- 1** Mini-PCI controller slot
2 Alignment pins

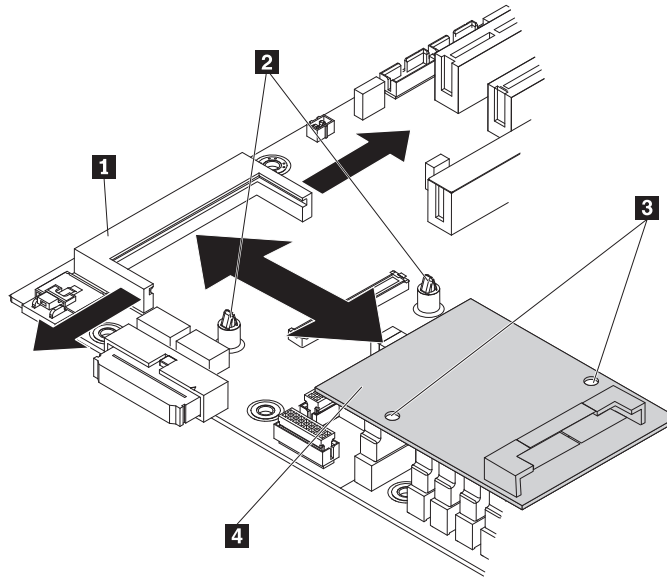
- 3** Alignment holes
4 Mini-SAS/SATA controller

6. Carefully disengage the tabs on each side of the SAS/SATA controller connector and the front of the SAS/SATA controller from the plastic standoff.
7. Grasp the edges of the SAS/SATA controller and pull it out of the connector. If the standoff comes away from the system board with the controller, gently pull it out of the controller and push it back into the hole on the system board.
8. If you are instructed to return the SAS/SATA controller, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the SAS/SATA controller

To install the SAS/SATA RAID controller, complete the following steps:

1. Touch the static-protective package that contains the SAS/SATA controller to any unpainted surface on the outside of the server; then, remove the SAS/SATA controller from the package.
2. Position the SAS/SATA controller over the connector and the plastic standoff; then, press the SAS/SATA controller firmly into the connector and onto the plastic standoff.



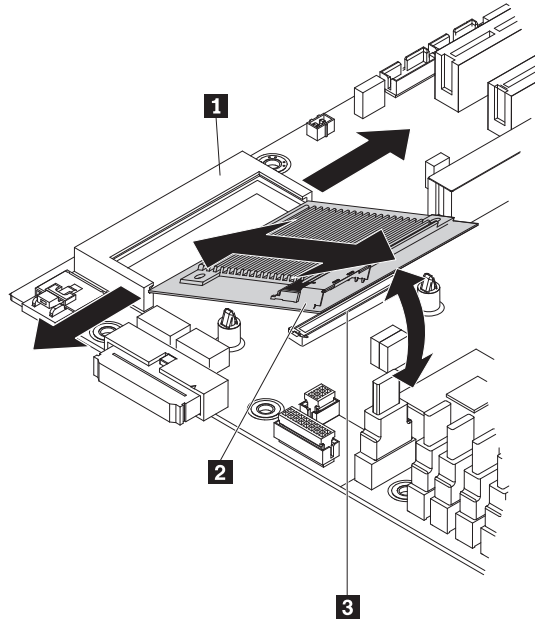
- | | | | |
|----------|--------------------------|----------|--------------------------|
| 1 | Mini-PCI controller slot | 3 | Alignment holes |
| 2 | Alignment pins | 4 | Mini-SAS/SATA controller |

3. Connect the signal cable to the SAS/SATA controller.
4. Install and lock the side cover (see “Installing the side cover” on page 63).
5. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the optional mini-PCI-X enablement card

To remove the mini-PCI-X enablement card, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Open the rear adapter-retention bracket until the release lever on the right side of the bracket clicks into place.
5. Carefully disengage the tabs on each side of the mini-PCI slot **1** connector and the front of the mini-PCI-X enablement card **2** from the plastic standoff.

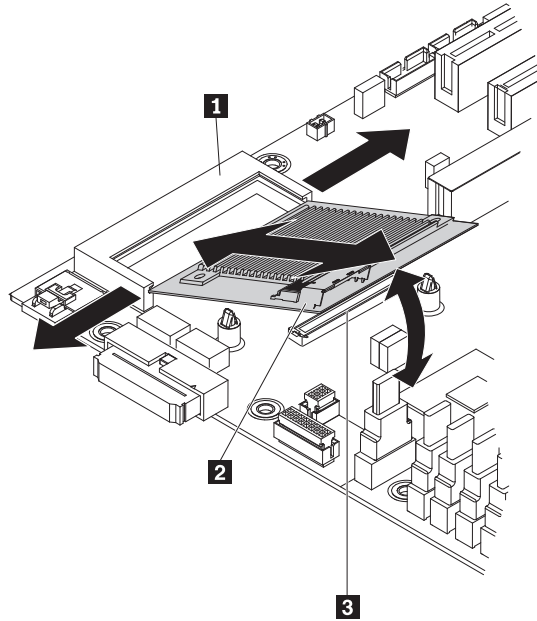


6. Disconnect the mini-PCI-X enablement card from the mini-PCI-X enablement card connector ; then, grasp the edges of the mini-PCI-X enablement card and pull it out of the mini-PCI slot. If the standoff comes away from the system board with the card, gently pull it out of the card and push it back into the hole on the system board.
7. If you are instructed to return the mini-PCI-X enablement card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the optional mini-PCI-X enablement card

To install the optional mini-PCI-X enablement card, complete the following steps:

1. Touch the static-protective package that contains the mini-PCI-X enablement card **2** to any unpainted surface on the outside of the server; then, remove mini-PCI-X enablement card **3** from the package.
2. Position the mini-PCI-X enablement card over the mini-PCI slot **1** connector and the plastic standoff. Press the mini-PCI-X enablement card firmly into the mini-PCI slot connector and into the mini-PCI-X enablement card connector, and then onto the plastic standoff.



3. Install and lock the side cover (see “Installing the side cover” on page 63).
4. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the RAID-MR10i SAS/SATA controller

To remove the IBM ServeRAID-MR10i SAS/SATA controller from the server, complete the following steps:

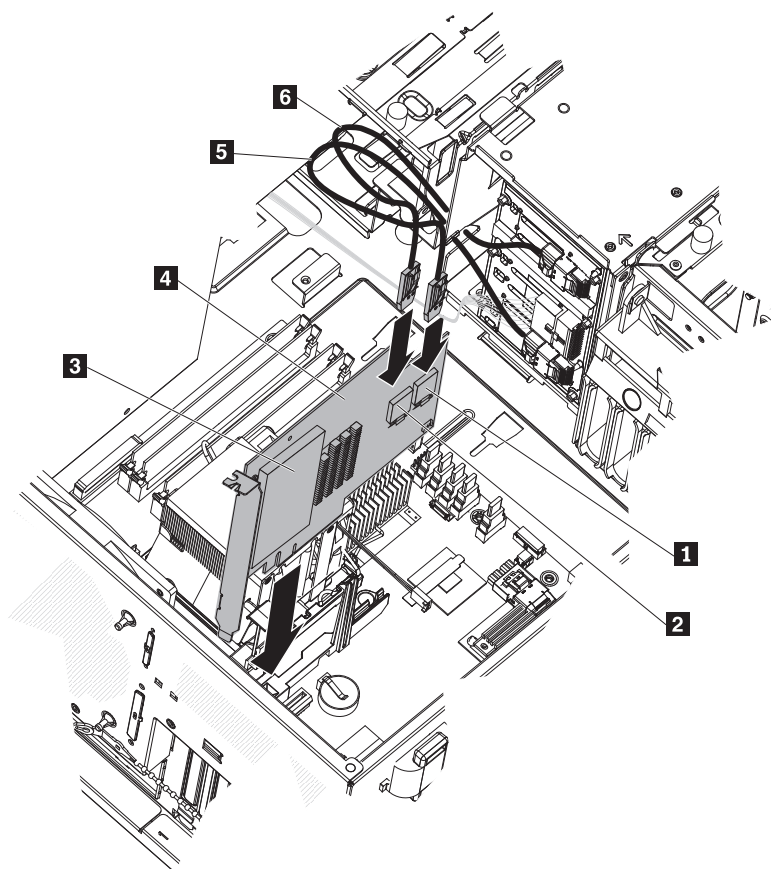
1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. If you are replacing the ServeRAID-MR10i SAS/SATA controller, disconnect the signal cables from the controller and the power cable from the power supply; then, remove the controller from the server.
5. If you are instructed to return the adapter, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the RAID-MR10i SAS/SATA controller

Some server models come with a IBM ServeRAID-MR10i SAS/SATA controller. The ServeRAID-MR10i SAS/SATA controller enables integrated RAID level-5 capability on hot-swap SAS models that support 2.5-inch and 3.5- inch SAS hard disk drives. To install and cable the ServeRAID-MR10i SAS/SATA controller, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Remove the hard disk drive fan assembly:
 - a. Disconnect the hard disk drive fan assembly cable from the system board and make a note of where the cable was connected for later installation.
 - b. Remove all hard disk drives.
 - c. Press and hold the drive cage release tab on the side of the drive cage; then, rotate the drive cage out of the chassis until the retaining tab on top of the cage locks into place.
 - d. Pull out on the hard disk drive fan assembly release tabs (at the blue dots); then, rotate the assembly away from the drive cage slightly.
5. Disconnect the signal and power cables and the existing SAS/SATA controller (if one is installed); then, remove the controller from the server.
6. Touch the static-protective package that contains the ServeRAID-MR10i SAS/SATA controller to any unpainted metal surface on the server. Then, remove the ServeRAID-MR10i SAS/SATA controller from the package.
7. Align the ServeRAID-MR10i SAS/SATA controller so that the keys align correctly with the connector on the system board.

Attention: Incomplete insertion might cause damage to the system board or the ServeRAID-MR10i controller.



- | | | | |
|----------|--|----------|-------------------------------------|
| 1 | Hard disk drive cable connectors 4 - 7 | 4 | ServeRAID-MR10i SAS/SATA controller |
| 2 | Hard disk drive cable connectors 0 - 3 | 5 | Hard disk drive cables 4 - 7 |
| 3 | Battery | 6 | Hard disk drive cables 0 - 3 |

Note: The drive cage should be in the open position. This illustration shows it in the closed position.

8. Press the ServeRAID-MR10i SAS/SATA controller firmly into the connector on the system board.
9. Take the other end of the signal cable that is attached to the drive backplane section for drive bays 0 through 3 (as labeled on the front of the drive cage) and connect it to the connector that is closest to the battery on the ServeRAID-MR10i SAS/SATA controller. If drives are installed in drive bays 4 through 7 (as labeled on the front of the drive cage), take the other end of the signal cable that is attached to drive backplane section for drive bays 4 through 7 and connect it to the connector that is farthest from the battery on the ServeRAID-MR10i SAS/SATA controller.
10. Replace the hard disk drive fan assembly:
 - a. Insert the hard disk drive fan assembly retaining tab over the right edge of the hard disk drive backplane; then, rotate the assembly toward the backplane. Do not fully close the hard disk drive fan assembly.
 - b. Route the signal cables and power cable through the slot on the edge of the hard disk drive fan assembly. Make sure that the cables will not be

pinched between the hard disk drive fan assembly and the hard disk drive backplane when the assembly is installed.

- c. Rotate the hard disk drive fan assembly toward the backplane until the release tabs are fully engaged and snaps in place.
11. Reconnect the hard disk drive fan assembly cable to the system board.
12. Rotate the drive cage back into the server until it stops; then, press and hold the retaining tab on top of the drive cage while you rotate the drive cage into the chassis until it locks into place.
13. Reinstall the hard disk drives.

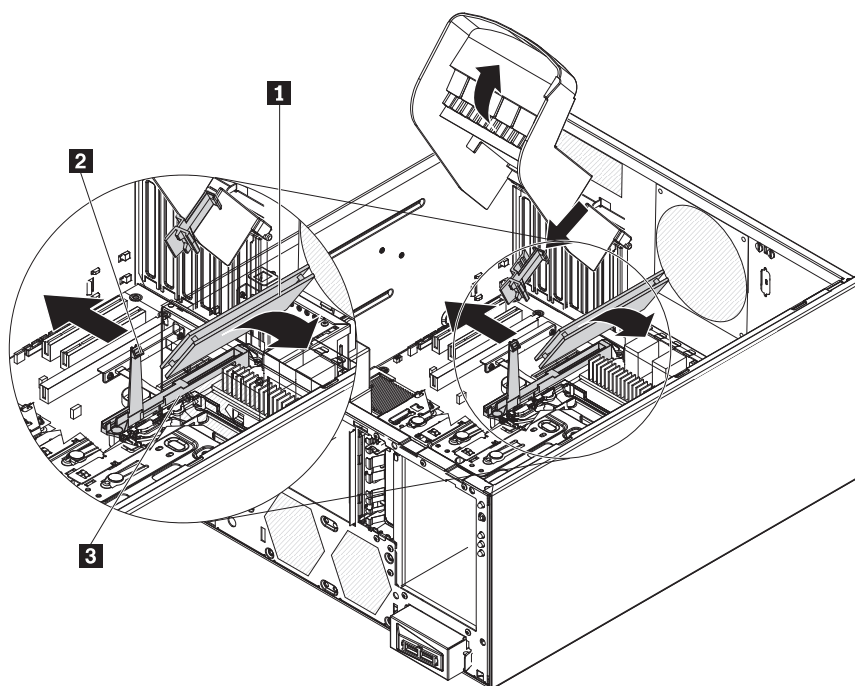
Note: Before you continue, check all internal power cables to make sure that they are connected to the system board and other optional devices.

14. Install the side cover (see “Installing the side cover” on page 63).
15. Lock the side cover.
16. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing an IBM Remote Supervisor Adapter II SlimLine adapter

To remove a Remote Supervisor Adapter II SlimLine adapter from the server, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Rotate the rear adapter-retention bracket out of the server.
5. Press the Remote Supervisor Adapter II SlimLine support-bracket-retention clip outward slightly and grasp the Remote Supervisor Adapter II SlimLine adapter and lift it out of the server.



- 1** Remote Supervisor Adapter II SlimLine adapter
- 2** Remote Supervisor Adapter II SlimLine retention clip
- 3** Remote Supervisor Adapter II SlimLine support bracket

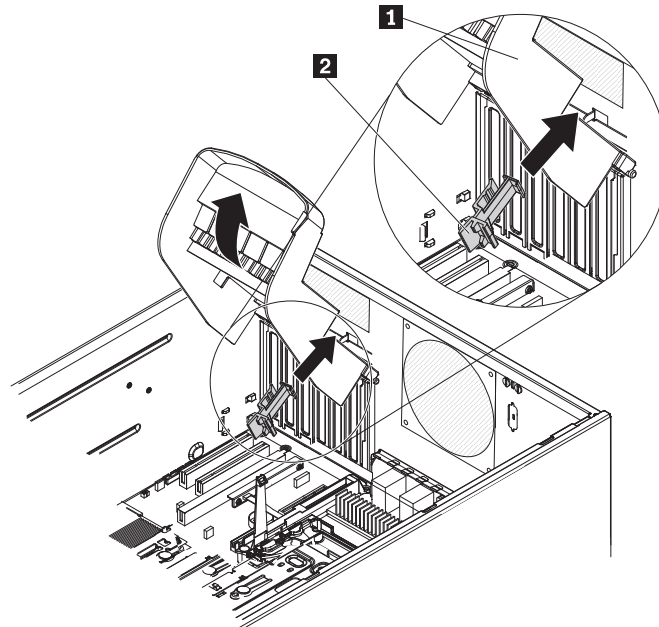
6. If you are instructed to return the adapter, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an IBM Remote Supervisor Adapter II SlimLine adapter

An optional IBM Remote Supervisor Adapter II SlimLine adapter must be installed only in its dedicated connector on the system board. See “System board internal connectors” on page 10 for the location of this connector on the system board. After you install the Remote Supervisor Adapter II SlimLine adapter, the systems-management Ethernet port on the rear of the server is active.

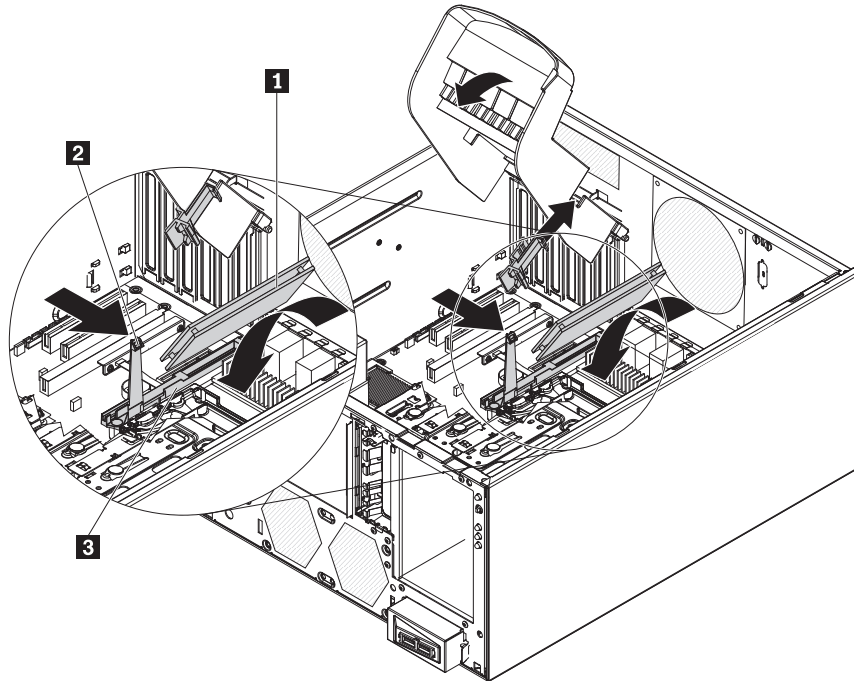
To install a Remote Supervisor Adapter II SlimLine adapter, complete the following steps:

1. Read the safety information beginning on page vii, and “Installation guidelines” on page 57.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Lay the server on its side.
4. Unlock the side cover.
5. Remove the side cover (see “Removing the side cover” on page 62).
6. Open the rear adapter-retention bracket **1** and install the Remote Supervisor Adapter II SlimLine adapter retention tab **2** on the bracket by clipping it onto the rear adapter-retention bracket.



7. Carefully grasp the Remote Supervisor Adapter II SlimLine adapter by its top edge or upper corners, and align it with the Remote Supervisor Adapter II SlimLine adapter guide and the connector on the system board.

Attention: Incomplete insertion might cause damage to the system board or the adapter.



8. Press the Remote Supervisor Adapter II SlimLine adapter **1** firmly into the connector and under the retention clip **2** on the Remote Supervisor Adapter II SlimLine adapter-support bracket **3**.
9. Close the rear adapter-retention bracket.
10. Install the side cover (see “Installing the side cover” on page 63).
11. Lock the side cover.
12. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing and replacing FRUs

Field replaceable units (FRUs) must be installed only by trained service technicians.

Removing a non-hot-swap power supply

This procedure applies only to server models that have a non-hot-swap power supply. See “Removing a hot-swap power supply” on page 81 for information about the removal of a hot-swap power supply.

When you remove or install a non-hot-swap power supply, observe the following precautions.

Statement 8:



CAUTION:

Never remove the cover on a power supply or any part that has the following label attached.



Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

To remove a non-hot-swap power supply, complete the following steps:

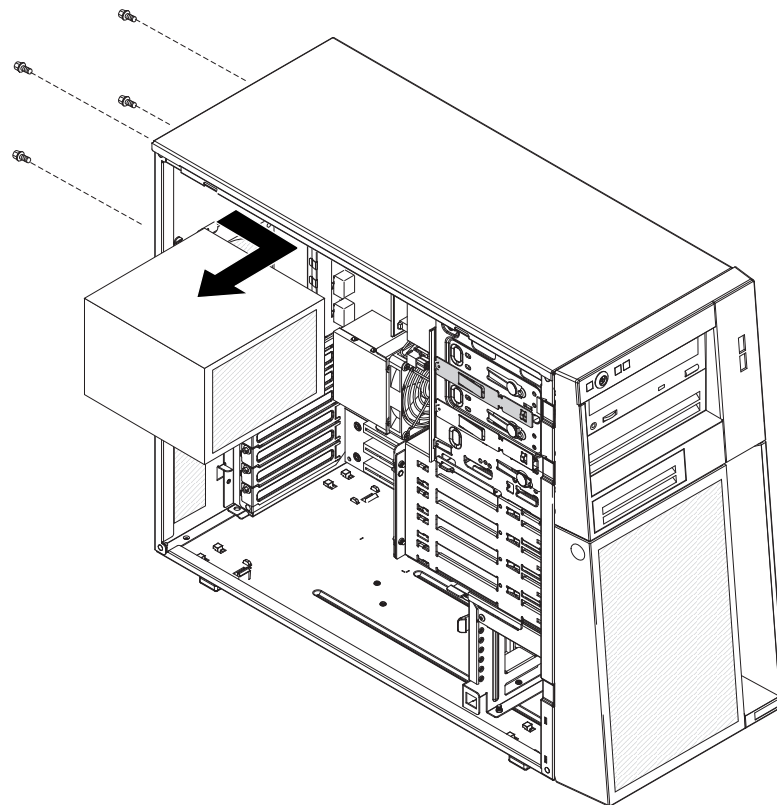
1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).

Note: It might be helpful to lay the server on its side for the remainder of this procedure.

4. Disconnect the cables from the power supply to the system board and all internal components.

Attention: Support the power supply while you remove the mounting screws. After the screws are removed, the power supply is loose and can damage other components in the server.

5. While you support the power supply, remove the four screws that secure it to the chassis; then, lift the power supply out of the chassis. Save the screws to use when you install the replacement power supply.



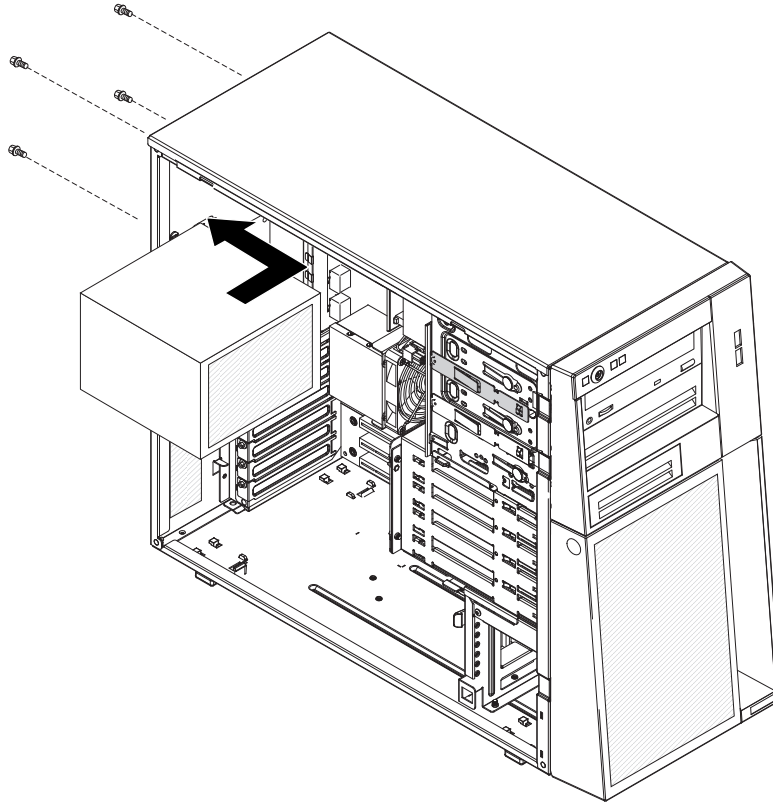
6. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a non-hot-swap power supply

This procedure applies only to server models that have a non-hot-swap power supply. See “Installing a hot-swap power supply” on page 83 for information about the installation of a hot-swap power supply.

To install a non-hot-swap power supply, complete the following steps:

1. Position the power supply in the chassis so that the screw holes in the power supply are aligned with the corresponding holes in the rear of the chassis.



2. Install the four screws that secure the power supply to the chassis.
3. Connect the cables from the power supply to the system board and all internal components.
4. Install the side cover (see “Installing the side cover” on page 63).
5. Lock the side cover if you unlocked it during removal.
6. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the microprocessor and fan sink

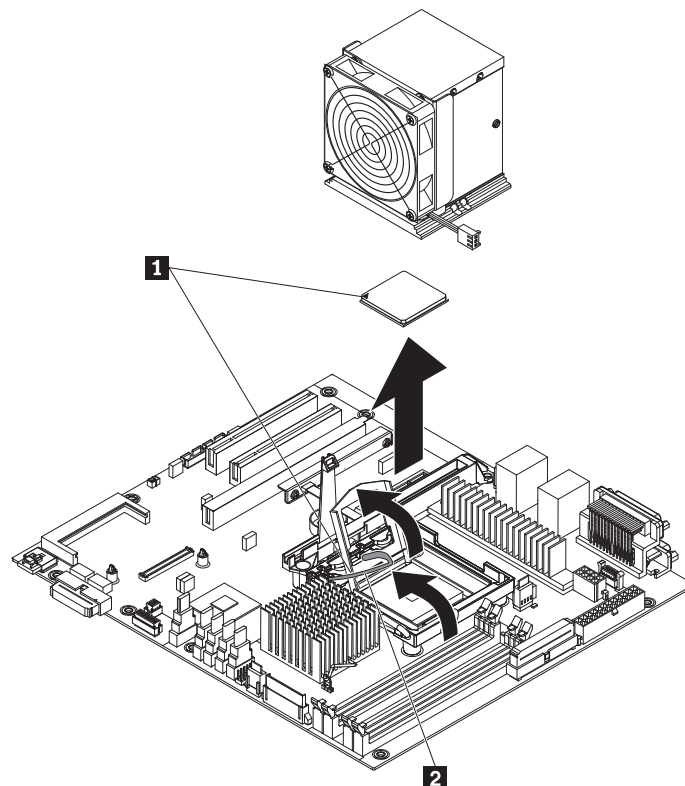
To remove the microprocessor and fan sink, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Turn the server on its side so that it is lying flat, with the cover facing up.
4. Unlock and remove the side cover (see “Removing the side cover” on page 62).
5. Disconnect any cables that impede access to the fan sink and microprocessor.

Attention: The fan-sink retention lever is spring-loaded when the fan sink is in place. Releasing the lever too quickly or allowing it to spring upward can damage the fan sink and surrounding components.

6. Remove the fan sink from the microprocessor:
 - a. Disconnect the fan-sink cable from the system board.
 - b. Release the fan-sink retention lever by pressing down on the end, moving it to the side and slowly releasing it to the open (up) position.

Important: Be careful when you handle the microprocessor and fan sink. If the microprocessor and fan sink will be reused, do not contaminate the thermal material between them.

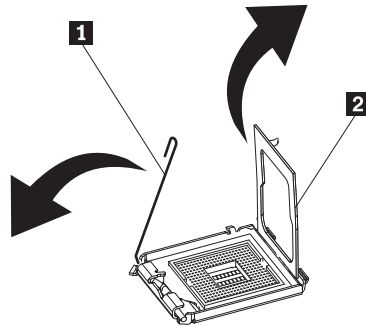


- 1** Orientation indicators
2 Fan-sink retention lever

- c. Tip the top of the fan sink toward the front of the server while you slide it away from the lower flange of the retention module; then, remove it from the server. After removal, place the fan sink on its side on a clean, flat surface.

Attention: The microprocessor retention latch is spring-loaded when the microprocessor is in place. Releasing the latch too quickly or allowing it to spring upward can damage the microprocessor and surrounding components.

7. Release the microprocessor retention latch **1** by pressing down on the end, moving it to the side, and slowly releasing it to the open (up) position.



8. Open the microprocessor bracket frame **2** by lifting up the tab on the top edge.
9. Carefully lift the microprocessor straight up and out of the socket, and place it on a static-protective surface.
10. If you are instructed to return the microprocessor and fan sink, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a microprocessor and fan sink

To install the microprocessor, complete the following steps:

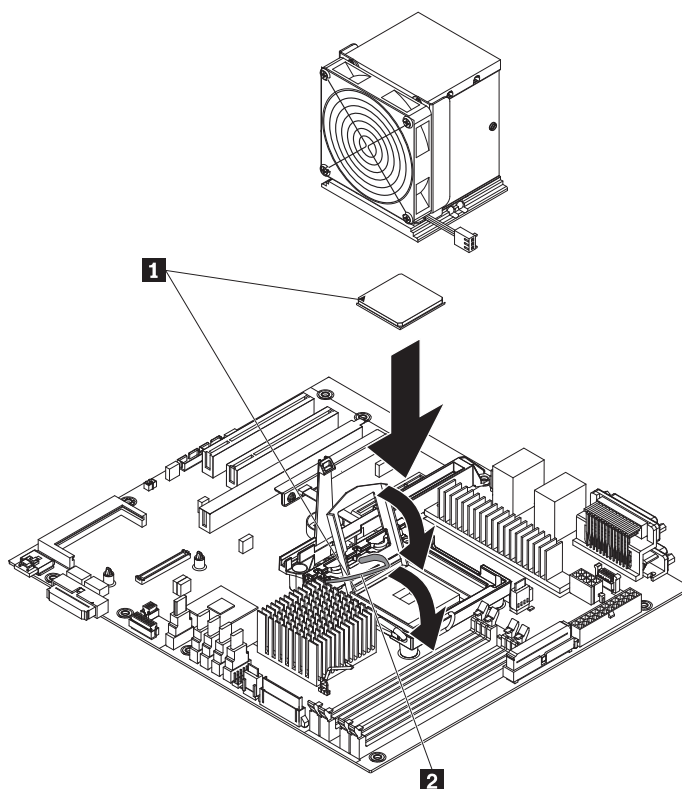
1. Touch the static-protective package that contains the microprocessor to any unpainted metal surface on the server. Then, remove the microprocessor from the package.
2. Remove the protective cover, tape, or label from the surface of the microprocessor socket, if any is present.
3. Rotate the release lever on the microprocessor socket to the fully open position.

Attention: Make sure that the release lever on the microprocessor socket is in the fully open position before you insert the microprocessor in the socket. Failure to do so might result in permanent damage to the microprocessor, microprocessor socket, and system board.

4. Carefully grasp the microprocessor and place the microprocessor into the microprocessor socket.

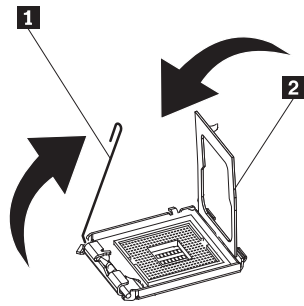
Note: To maintain correct orientation between the microprocessor and the microprocessor socket during installation, observe the following information:

- The microprocessor has two notches that are keyed to two tabs on the sides of the socket.
- A triangle-shaped indicator on one corner of the microprocessor points to a 45-degree angle on one corner of the socket.
- Do not use excessive force when you press the microprocessor into the socket.



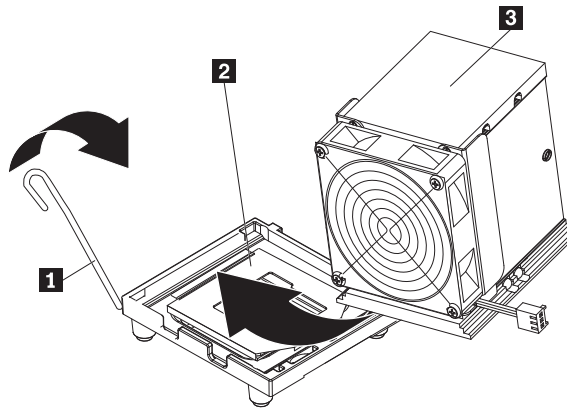
- 1** Orientation indicators
2 Fan-sink retention lever

5. Close the microprocessor bracket frame **2**; then, close the microprocessor retention latch **1** and lock it securely in place.



6. Install the fan sink:
 - a. Make sure that the fan-sink retention lever is in the fully open position.

Important: Be careful when you handle the microprocessor and fan sink. Do not contaminate the thermal material between them.



- b. Slide the bottom edge of the fan sink under the lower flange of the retention module **2**; then, place the top of the fan sink **3** onto the top of the retention module.
 - c. Close the fan-sink retention lever **1** and lock it securely in place.
 - d. Reconnect the fan-sink cable to the system board (see “System board internal connectors” on page 10 for the location of the fan-sink connector).
7. Reconnect any cables that you disconnected during the removal of the old microprocessor.
8. Install the side cover (see “Installing the side cover” on page 63).
9. Lock the side cover if you unlocked it during removal.
10. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Thermal grease

The thermal grease must be replaced whenever the fan sink has been removed from the top of the microprocessor and is going to be reused or when debris is found in the grease.

When you are installing the fan sink on the same microprocessor that is was removed from, make sure that:

- The thermal grease on the fan sink and microprocessor is not contaminated.

- Additional thermal grease is not added to the existing thermal grease on the fan sink and microprocessor.

Note:

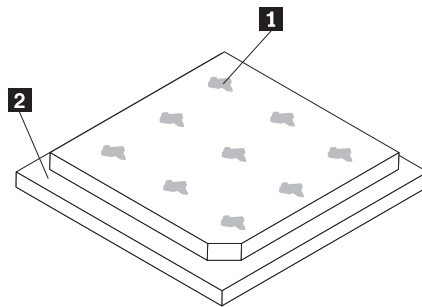
- Read the Safety information on page vii.
- Read the “Installation guidelines” on page 57.
- Read “Handling static-sensitive devices” on page 60.

To replace damaged or contaminated thermal grease on the microprocessor and fan sink, complete the following steps:

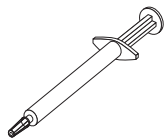
1. Place the fan sink on a clean work surface.
2. Remove the cleaning pad from its package and unfold it completely.
3. Use the cleaning pad to wipe the thermal grease from the bottom of the fan sink.

Note: Make sure that all of the thermal grease is removed.

4. Use a clean area of the cleaning pad to wipe the thermal grease **1** from the microprocessor **2**; then, dispose of the cleaning pad after all of the thermal grease is removed.



5. Use the thermal-grease syringe to place 9 uniformly spaced dots of 0.02 mL each on the top of the microprocessor. The outermost dots must be within approximately 5 mm of the edge of the microprocessor, this is to ensure uniform distribution of the grease.



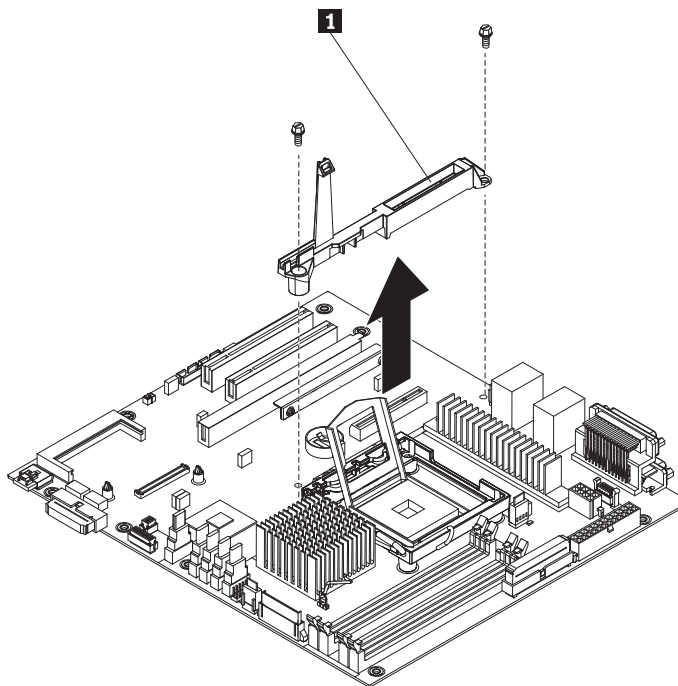
Note: If the grease is properly applied, approximately half of the grease will remain in the syringe.

6. Install the fan sink onto the microprocessor as described in “Installing a microprocessor and fan sink” on page 120.

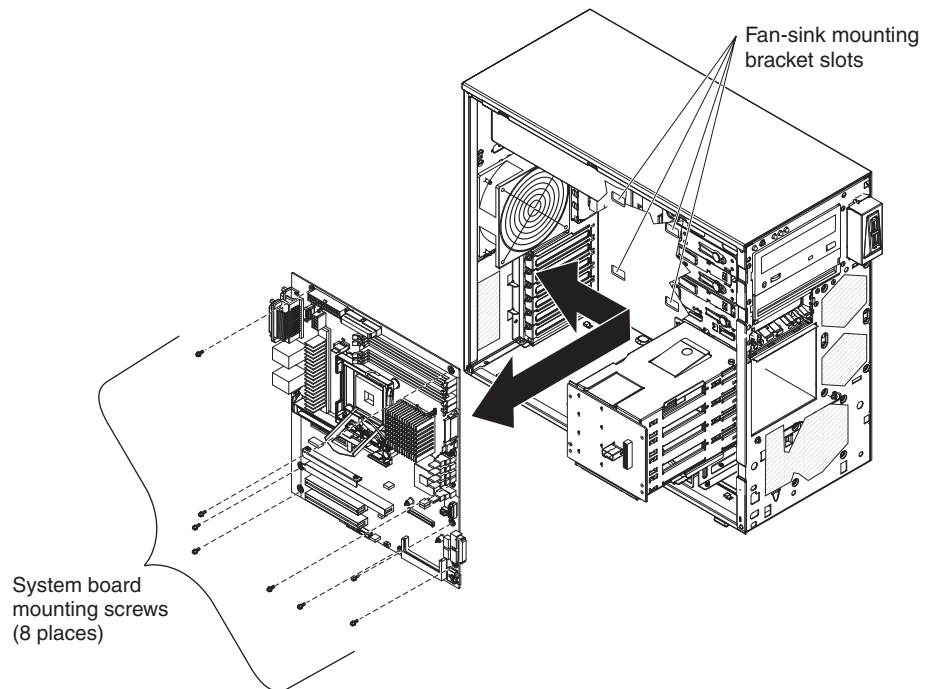
Removing the system board

To remove the system board, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Turn the server on its side so that it is lying flat, with the cover facing up.
4. Unlock and remove the side cover (see “Removing the side cover” on page 62).
5. Note where each cable is connected; then, disconnect all cables from the system board.
6. Press and hold the drive cage release tab; then, rotate the drive cage out of the chassis until the retaining tab on top of the cage locks into place.
7. Remove any of the following components (in addition to others that might not be listed) that are installed on the system board and put them in a safe, static-protective place:
 - Adapters (see “Removing an adapter” on page 68).
 - Microprocessor and fan sink (see “Removing the microprocessor and fan sink” on page 118).
 - DIMMs (see “Removing a memory module” on page 84).
 - Battery (see “Removing the battery” on page 86).
 - SAS/SATA controller (see “Removing the mini-SAS/SATA controller” on page 106).
8. Remove the two screws that secure the Remote Supervisor Adapter II SlimLine adapter-support bracket **1** to the system board and remove the Remote Supervisor Adapter II SlimLine adapter-support bracket from the system board. Set it aside for use later.

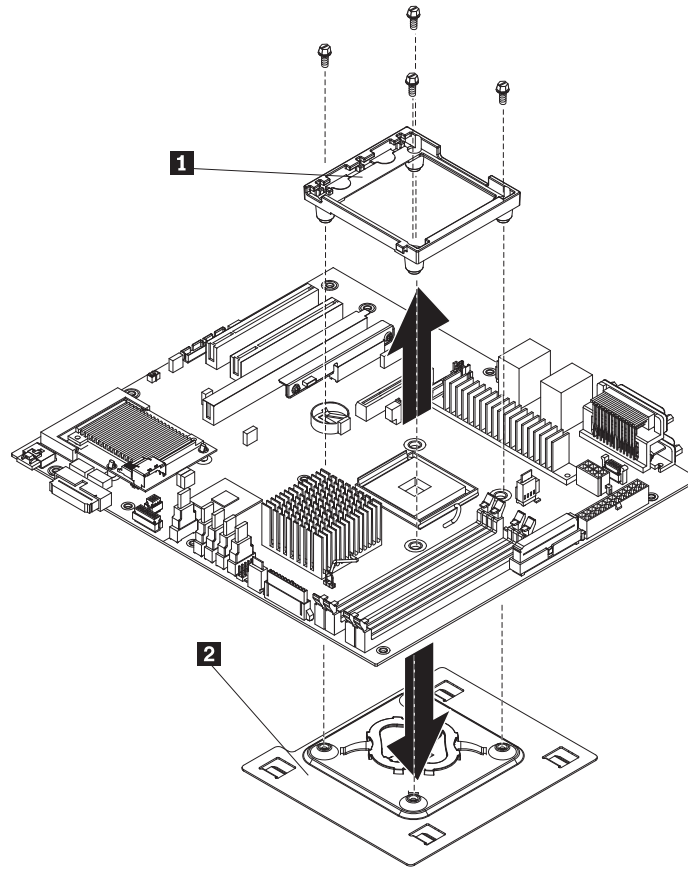


9. Remove the eight screws that secure the system board to the chassis.



10. Slide the system board toward the front of the server to disengage the tabs on the fan sink mounting bracket from the slots on the bottom of the chassis; then, carefully lift the system board out of the server.
11. Remove the four screws that secure the fan sink retention module **1** and fan sink mounting bracket **2** to the system board; then, set the fan sink retention module, fan sink mounting bracket, and screws aside for use later.

Note: Make sure that you observe the orientation of the fan sink retention module before you move it so that when you reinstall it, you install it in the same orientation.

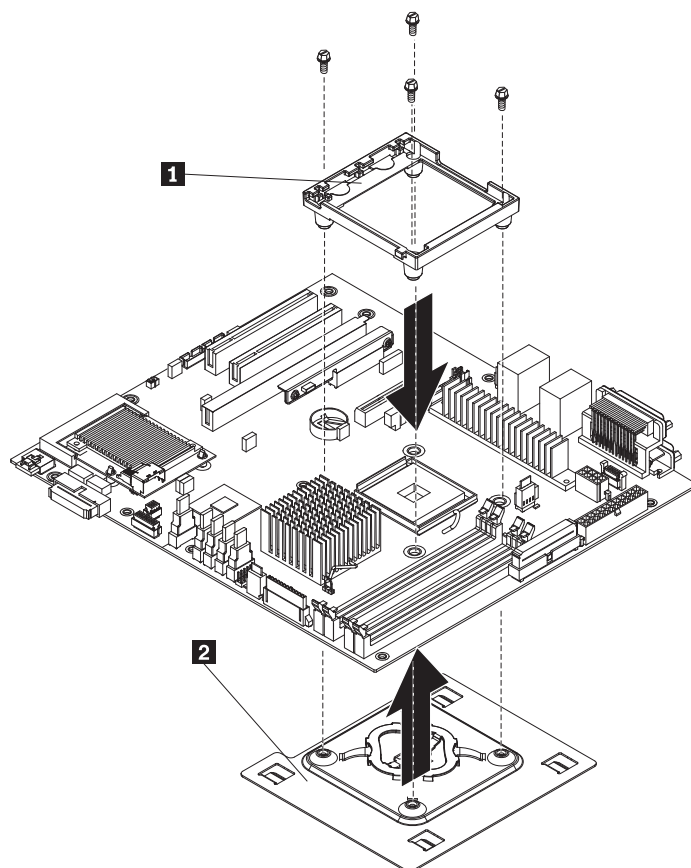


12. If you are instructed to return the system board, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the system board

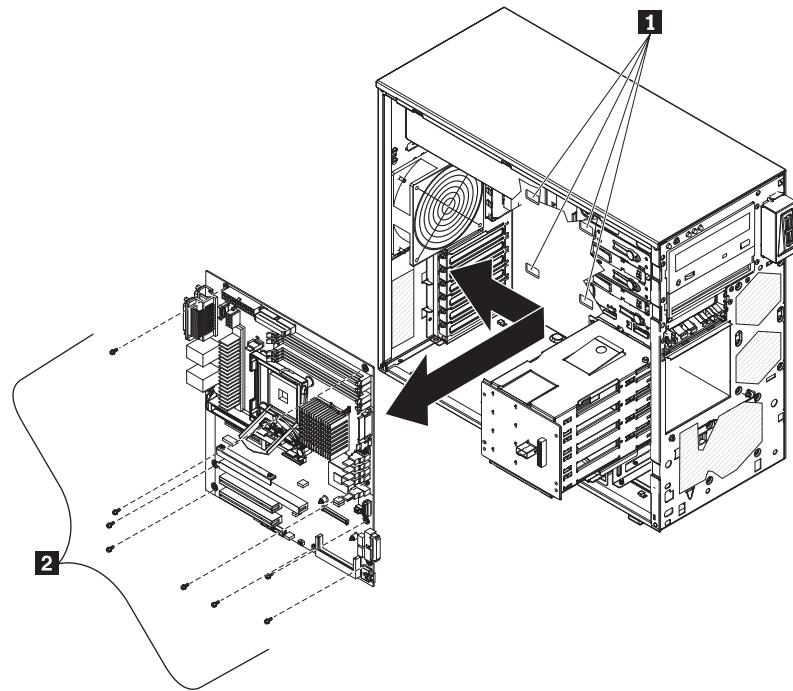
To install the system board, complete the following steps:

1. Touch the static-protective package that contains the system board to any unpainted metal surface on the server. Then, remove the system board from the package.
2. Place the fan sink mounting bracket **2** underneath the system board and align the holes on fan sink mounting bracket with the four screw holes for the fan sink retention module slot on system board. Place the fan sink retention module **1** on top of the system board and align it with the four screw holes for the fan sink retention module slot (make sure that the fan sink retention module orientation of the is correct). Take the four screws that you removed earlier and secure the fan sink mounting bracket and the fan sink retention module to the system board.

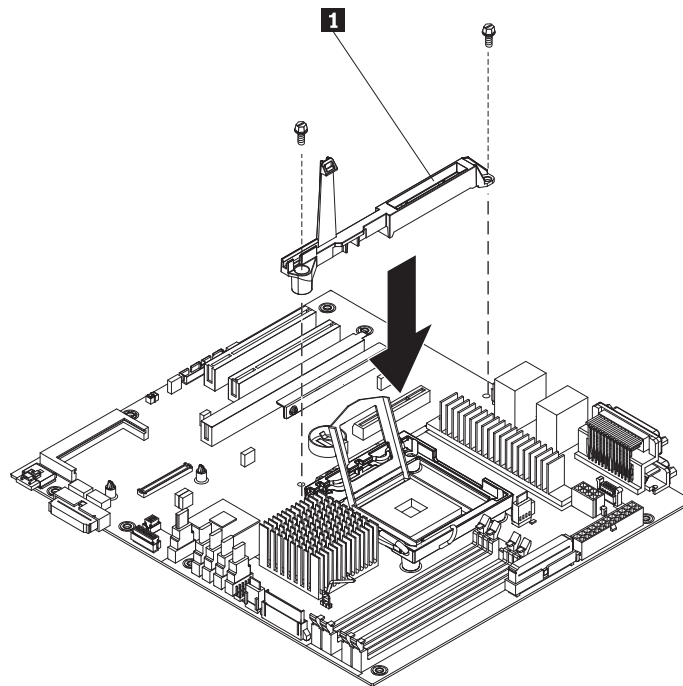


3. Insert the system board into the chassis and slide it toward the rear of the server until the tabs on the fan sink mounting bracket is fully engaged in the holes for fan sink mounting bracket slots **1** on the bottom the chassis.

Note: The tabs are fully engaged when the screw holes in the system board are aligned with the corresponding holes in the chassis.



4. Install the eight screws **2** that secure the system board to the chassis.
5. Reinstall the Remote Supervisor Adapter II SlimLine support bracket **1** with the two screws that you removed earlier.



6. Install any of the following components that you removed from the system board:
 - SAS/SATA controller (see “Installing the SAS/SATA controller” on page 107).
 - Battery (see “Installing the battery” on page 86).
 - DIMMs (see “Installing a memory module” on page 85).

- Microprocessor and fan sink (see “Installing a microprocessor and fan sink” on page 120).
 - Adapters (see “Installing an adapter” on page 69).
7. Press and hold the retaining tab on top of the cage; then, rotate the drive cage into the chassis until it locks into place.
 8. Reconnect any cables to the system board that you disconnected during removal.
 9. Install the side cover (see “Installing the side cover” on page 63).
 10. Lock the side cover if you unlocked it during removal.
 11. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Chapter 5. Diagnostics

This chapter describes the diagnostic tools that are available to help you solve problems that might occur in the server.

If you cannot diagnose and correct a problem by using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 247 for more information.

Diagnostic tools

The following tools are available to help you diagnose and solve hardware-related problems:

- **POST beep codes, error messages, and error logs**

The power-on self-test (POST) generates beep codes and messages to indicate successful test completion or the detection of a problem. See “POST” for more information.

- **Troubleshooting tables**

These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 147.

- **Server LEDs**

Use the LEDs on the server to diagnose system errors quickly. See “Error LEDs” on page 160 for more information.

- **Diagnostic programs and messages**

The diagnostic programs on the *Diagnostics CD* are the primary method of testing the major components of the server. See “Diagnostic programs and messages” on page 163 for more information.

POST

When you turn on the server, it performs a series of tests to check the operation of the server components and some optional devices in the server. This series of tests is called the power-on self-test, or POST.

If a power-on password is set, you must type the password and press Enter, when you are prompted, for POST to run.

If POST is completed without detecting any problems, one short beep occurs, and the server startup is completed.

If POST detects a problem, several beeps might sound, or an error message is displayed. See “POST beep codes” on page 130 and “POST error codes” on page 135 for more information.

POST beep codes

A beep code is a combination of short or long beeps or series of short beeps that are separated by pauses. For example, a “1-2-3” beep code is one short beep, a pause, two short beeps, and pause, and three short beeps. A beep code indicates that POST has detected a problem.

The following table describes the beep codes and suggested actions to correct the detected problems.

A single problem might cause more than one error message. When this occurs, correct the cause of the first error message. The other error messages usually will not occur the next time POST runs.

Exception: If multiple error codes indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 153 for information about diagnosing microprocessor problems.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Beep code	Description	Action
One short beep	Indicates successful completion of POST, with no errors.	None
1-1-3	CMOS write/read test failed.	<ol style="list-style-type: none">1. Reseat the battery.2. Clear CMOS. See “System board jumpers” on page 14 for information about how to clear CMOS.3. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. Batteryb. (Trained service technician only) System board
1-1-4	BIOS ROM checksum failed.	<ol style="list-style-type: none">1. Recover the BIOS code.2. (Trained service technician only) Replace the system board.
1-2-1	Programmable interval timer failed.	(Trained service technician only) Replace the system board.
1-2-2	DMA initialization failed.	(Trained service technician only) Replace the system board.
1-2-3	DMA page register write/read failed.	(Trained service technician only) Replace the system board.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Beep code	Description	Action
1-2-4	RAM refresh verification failed.	<ol style="list-style-type: none"> 1. Reseat the DIMMs. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) System board
1-3-1	First 64 K RAM test failed.	<ol style="list-style-type: none"> 1. Reseat the DIMMs. 2. Clear CMOS. See “System board jumpers” on page 14 for information about how to clear CMOS. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) System board
2-1-1	Secondary DMA register failed.	(Trained service technician only) Replace the system board.
2-1-2	Primary DMA register failed.	(Trained service technician only) Replace the system board.
2-1-3	Primary interrupt mask register failed.	(Trained service technician only) Replace the system board.
2-1-4	Secondary interrupt mask register failed.	(Trained service technician only) Replace the system board.
2-3-4	Search for video ROM failed.	(Trained service technician only) Replace the system board.
3-3-2	Critical SMBUS error occurred.	<ol style="list-style-type: none"> 1. Disconnect the power cord, wait 30 seconds, and retry. 2. Reseat the following components: <ol style="list-style-type: none"> a. DIMM b. System board c. oard 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. DIMM b. (Trained service technician only) System board

<ul style="list-style-type: none"> Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 		
Beep code	Description	Action
3-3-3	No operational memory in system.	<ol style="list-style-type: none"> Make sure that the system board contains the correct number and type of DIMMs; install or reseat the DIMMs; then, restart the server. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> DIMMs (Trained service technician only) System board

No-beep symptoms

The following table describes situations in which no beep code sounds when POST is completed.

Table 11. No-beep code symptoms

<ul style="list-style-type: none"> Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 		
No-beep symptom	Description	Action
No beeps occur, and the server operates correctly.		<ol style="list-style-type: none"> (Trained service technician only) Reseat the front information panel LED cable. (Trained service technician only) Replace the front information panel LED assembly.
No beeps occur, and there is no video.		See “Solving undetermined problems” on page 245.

Error logs

The server generates three error logs:

- **POST error log**

This log contains the three most recent error codes and messages that were generated during POST.

- **System-event/error log**

This log contains messages that were generated during POST and all system status messages from the service processor.

- **BMC system event log**

This log contains messages that were generated by the mini-BMC controller.

The system event/error log and mini-BMC system event log are limited in size. When these logs are full, new entries will not overwrite existing entries; therefore, you must periodically clear them through the Configuration/Setup Utility program (the menu choices are described in the *User Guide*). When you are troubleshooting an error, be sure to clear both logs so that you can find current errors more easily.

Important: After you complete a repair or correct an error, clear the mini-BMC system-event log to turn off the system-error LED on the front of the server.

Entries that are written to the system-event/error log and mini-BMC system event log during the early phase of POST show an incorrect date and time as the default time stamp; however, the date and time are corrected as POST continues.

Each system-event/error log entry is displayed on its own page. To move from one entry to the next, use the Up Arrow (↑) and Down Arrow (↓) keys.

You can view the contents of the POST error log and the system-event/error log from the Configuration/Setup Utility program. You can view the contents of the Diagnostics error log from the diagnostic programs on the *Diagnostics CD*. For more information about the diagnostic programs, see “Diagnostic programs and messages” on page 163.

Viewing error logs from the Configuration/Setup Utility program

For complete information about using the Configuration/Setup Utility program, see the *User Guide*.

To view the error logs from the Configuration/Setup Utility program, complete the following steps:

1. Turn on the computer.
2. When the prompt Press F1 for Configuration/Setup is displayed, press F1.
3. Use one of the following procedures:
 - To view the POST error log and system-event/error log, select **Event/Error Logs** → **System Event/Error Log**.
 - To view the BMC system-event log, select **Advanced Setup** → **Baseboard Management Controller (BMC) Setting** → **BMC System Event Log**.

Viewing the mini-BMC system-event log from the diagnostic programs

The BMC system-event log that is generated by the mini-BMC controller contains the same information, whether it is viewed from the Configuration/Setup Utility program or from the diagnostic programs.

For information about using the diagnostic programs, see “Running the diagnostic programs” on page 164.

To view the BMC system-event log that is generated by the mini-BMC controller from the diagnostic programs, complete the following steps:

1. If the server is running, turn off the server and all attached devices.
2. Turn on all attached devices; then, turn on the server.
3. When the prompt F2 for Diagnostics is displayed, press F2. If you have set both a power-on password and an administrator password, you must type the administrator password to run the diagnostic programs.
4. From the top of the screen, select **Hardware Info**.
5. From the list, select **BMC log**.

POST error codes

The following table describes the POST error codes and suggested actions to correct the detected problems.

<ul style="list-style-type: none">• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.• See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.		
Error code	Description	Action
062	Three consecutive boot failures using the default configuration.	<ol style="list-style-type: none">1. Update the system firmware to the latest level (see “Updating the firmware” on page 17).2. (Trained service technician only) Replace the system board.
101	Tick timer internal interrupt failure.	(Trained service technician only) Replace the system board.
102	Internal timer channel 2 test failure.	(Trained service technician only) Replace the system board.
106	Diskette controller error.	<ol style="list-style-type: none">1. Make sure that the Configuration/Setup Utility program correctly reflects the diskette drive information.2. Reseat the diskette drive cable.3. Reseat the diskette drive.4. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. Diskette drive cableb. Diskette drivec. (Trained service technician only) System board
151	Real-time clock error.	<ol style="list-style-type: none">1. Reseat the battery.2. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. Batteryb. (Trained service technician only) System board

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
162	Invalid configuration information or CMOS random-access memory (RAM) checksum failure.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. Reseat the following components: <ol style="list-style-type: none"> a. Battery b. Failing device (if the device is a FRU, the device must be reseated by a trained service technician only) 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. Failing device (if the device is a FRU, the device must be replaced by a trained service technician only) c. (Trained service technician only) System board
163	Time of day not set.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, make sure that the date and time are correct, and save the settings. 2. Reseat the battery. 3. Clear CMOS. See “System board jumpers” on page 14 for information about how to clear CMOS. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board
164	Memory size has changed.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, make sure that the date and time are correct, and save the settings. 2. Reseat the battery. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
175	Service processor flash code damaged or not loaded.	<ol style="list-style-type: none"> 1. Update the Remote Supervisor Adapter II SlimLine firmware. 2. Replace the Remote Supervisor Adapter II SlimLine.
178	Security hardware error.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. (Trained service technician only) Replace the system board.
184	Power-on password damaged.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. Reseat the battery. 3. Clear CMOS. See “System board jumpers” on page 14 for information about how to clear CMOS. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board
187	VPD serial number not set.	<ol style="list-style-type: none"> 1. Set the serial number by updating the BIOS code level (see “Updating the firmware” on page 17). 2. (Trained service technician only) Replace the system board.
188	Service processor firmware corrupted or not installed.	<ol style="list-style-type: none"> 1. Restart the server. 2. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 3. Update the Remote Supervisor Adapter II SlimLine firmware (see “Updating the firmware” on page 17). 4. (Trained service technician only) Replace the system board.
189	Three attempts were made to access the server with an incorrect password.	Restart the server and enter the administrator password; then, run the Configuration/Setup Utility program and change the power-on password.
289	A DIMM has been disabled by system.	<ol style="list-style-type: none"> 1. Make sure that the DIMM is installed correctly (see “Installing a memory module” on page 85). 2. Replace the DIMM. 3. (Trained service technician only) Replace the system board.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
602	Invalid diskette boot record	<ol style="list-style-type: none"> 1. Replace the diskette. 2. Reseat the diskette drive cables. 3. Replace the diskette drive.
604	Internal diskette drive error	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. Reseat the diskette drive signal cables. 3. Replace the diskette drive.
962	Parallel port configuration error	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and make sure that the parallel port setting is correct. 2. (Trained service technician only) Replace the system board.
1162	Serial port error	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and make sure that the serial port settings are correct. 2. (Trained service technician only) Replace the system board.
1600	The service processor is not functioning.	(Trained service technician only) Replace the system board.
1601	System-management adapter communication error.	<ol style="list-style-type: none"> 1. Update the BMC firmware (see “Updating the firmware” on page 17). 2. (Trained service technician only) Replace the system board.
1603	System-management adapter communication error.	<ol style="list-style-type: none"> 1. Make sure that the Remote Supervisor Adapter II SlimLine is installed correctly. 2. Update the Remote Supervisor Adapter II SlimLine firmware (see “Updating the firmware” on page 17). 3. Reseat the following components: <ol style="list-style-type: none"> a. Adapter b. (Trained service technician only) System board 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Remote Supervisor Adapter II SlimLine b. (Trained service technician only) Replace the system board.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
1762	Hard disk drive configuration error.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and load the default settings. 2. Reseat the following components: <ol style="list-style-type: none"> a. Hard disk drive cables b. Hard disk drive c. (Trained service technician only) System board 3. Replace the following components one at a time, in the order shown, restarting the server each time. <ol style="list-style-type: none"> a. Hard disk drive cables b. Hard disk drive c. (Trained service technician only) System board
178x	Fixed disk error. Note: x is the drive that has the error.	<ol style="list-style-type: none"> 1. Run the hard disk drive diagnostic tests on drive x. 2. Reseat the following components, depending on the server model: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive x b. SAS/SATA controller • Simple-swap models: <ol style="list-style-type: none"> a. Hard disk drive x b. Hard disk drive x cable 3. Replace the following components one at a time, depending on the server model, in the order shown, restarting the server each time: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive x b. Hard disk drive backplane c. SAS/SATA controller • Simple-swap models: <ol style="list-style-type: none"> a. Hard disk drive x b. Hard disk drive x cable 4. (Trained service technician only) Replace the system board.
1800	Unavailable PCI hardware interrupt.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and adjust the adapter settings. 2. Remove each adapter one at a time, restarting the server each time, until the failing adapter is isolated.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
1801	A PCI adapter has requested memory resources that are not available.	<ol style="list-style-type: none"> 1. Make sure that no devices have been disabled in the Configuration/Setup Utility program. 2. Change the order of the adapters in the PCI, and PCI Express slots. Make sure that the startup (boot) device is positioned early in the scanning order. (For information about the scanning order, see the <i>User Guide</i> on the <i>ThinkServer Documentation DVD</i>). 3. Make sure that the settings for the adapter and all other adapters in the Configuration/Setup Utility program are correct. If the memory resource settings are not correct, change them. 4. If all memory resources are being used, remove an adapter to make memory available to the adapter. Disabling the BIOS on the adapter should correct the error. See the documentation that comes with the adapter.
1802	No more I/O space is available for a PCI adapter.	<ol style="list-style-type: none"> 1. If the error code indicates a particular PCI or PCI-E slot or device, remove that device. 2. Reseat each adapter. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Failing PCI or PCI Express adapter b. (Trained service technician only) System board
1803	No more memory (above 1 MB for a PCI adapter).	<ol style="list-style-type: none"> 1. If the error code indicates a particular PCI or PCI-E slot or device, remove that device. 2. Reseat each adapter. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Failing PCI or PCI Express adapter b. (Trained service technician only) System board
1804	No more memory (below 1 MB for a PCI adapter).	<ol style="list-style-type: none"> 1. Remove the failing adapter. 2. Reseat each adapter. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Failing PCI or PCI Express adapter b. (Trained service technician only) System board

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
1805	PCI option ROM checksum error.	<ol style="list-style-type: none"> 1. Remove the failing adapter. 2. Reseat each adapter. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Failing PCI or PCI Express adapter b. (Trained service technician only) System board
1806	PCI built in self-test failure.	<ol style="list-style-type: none"> 1. If the error code indicates a particular PCI or PCI-Express slot or device, remove that device. 2. Reseat the following components: <ol style="list-style-type: none"> a. Each adapter b. (Trained service technician only, if the specified board is a FRU) The board that is indicated in the error code. (See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine CRU or FRU status.) 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.
1807	General PCI error.	<ol style="list-style-type: none"> 1. Make sure that no devices have been disabled in the Configuration/Setup Utility program. 2. Replace each adapter one at a time, restarting the server each time.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
1962	A hard disk drive does not contain a valid boot sector.	<ol style="list-style-type: none"> 1. Make sure that a bootable operating system is installed. 2. Run the hard disk drive diagnostic tests. 3. Reseat the following components, depending on the server model: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. SAS/SATA controller • Simple-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cable 4. Replace the following components one at a time, depending on the server model, in the order shown, restarting the server each time: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive backplane c. SAS/SATA controller • Simple-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cable 5. (Trained service technician only) Replace the system board.
2462	Video memory configuration error.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Video adapter (if one is installed) b. (Trained service technician only) System board 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Video adapter (if one is installed) b. (Trained service technician only) System board
3001	SMART monitoring failure predicted on hard disk drive	Replace the hard disk drive.
3003	SMART command execution failure on hard disk drive	Replace the hard disk drive.
3005	Current hard disk drive configuration do not support SMART function	Replace the hard disk drive.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
5962	DVD drive configuration error.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and load the default settings (see “Using the Configuration/Setup Utility program” on page 19). 2. Reseat the following components: <ol style="list-style-type: none"> a. DVD drive cable b. DVD drive c. System board 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.
00012000	Processor machine check error.	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
00019701	Microprocessor 1 failed the built in self-test (BIST).	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
01298001	No update data for microprocessor 1.	<ol style="list-style-type: none"> 1. Update the BIOS code again (see “Updating the firmware” on page 17). 2. (Trained service technician only) Reseat the microprocessor. 3. (Trained service technician only) Replace the microprocessor.
01298101	Bad update data for processor 1.	<ol style="list-style-type: none"> 1. Update the BIOS code again (see “Updating the firmware” on page 17). 2. (Trained service technician only) Reseat the microprocessor. 3. (Trained service technician only) Replace the microprocessor.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
I9990301	Hard disk drive boot sector error.	<ol style="list-style-type: none"> 1. Reseat the following components, depending on the server model: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. SAS/SATA controller • Simple-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cable 2. Replace the following components one at a time, depending on the server model, in the order shown, restarting the server each time: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive backplane c. SAS/SATA controller • Simple-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cable 3. (Trained service technician only) Replace the system board.
I9990650	AC power has been restored.	<ol style="list-style-type: none"> 1. Reseat the power cords. 2. Check for interruption of the external power. 3. Replace the power cords.

Checkout procedure

The checkout procedure is the sequence of tasks that you should follow to diagnose a problem in the server.

About the checkout procedure

Before you perform the checkout procedure for diagnosing hardware problems, review the following information:

- Read the safety information that begins on page vii.
- The diagnostic programs provide the primary methods of testing the major components of the server, such as the system board, Ethernet controller, serial ports, and hard disk drives. You can also use them to test some external devices. If you are not sure whether a problem is caused by the hardware or by the software, you can use the diagnostic programs to confirm that the hardware is working correctly.
- When you run the diagnostic programs, a single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run the diagnostic programs.

Exception: If multiple error codes or LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 153 for information about diagnosing microprocessor problems.

- Before you run the diagnostic programs, you must determine whether the failing server is part of a shared hard disk drive cluster (two or more servers sharing external storage devices). If it is part of a cluster, you can run all diagnostic programs except the ones that test the storage unit (that is, a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit. The failing server might be part of a cluster if any of the following conditions is true:
 - You have identified the failing server as part of a cluster (two or more servers sharing external storage devices).
 - One or more external storage units are attached to the failing server and at least one of the attached storage units is also attached to another server or unidentifiable device.
 - One or more servers are located near the failing server.

Important: If the server is part of a shared hard disk drive cluster, run one test at a time.

- If the server is halted and a POST error code is displayed, see “Error logs” on page 133. If the server is halted and no error message is displayed, see “Troubleshooting tables” on page 147 and “Solving undetermined problems” on page 245.
- For information about power supply problems, see “Solving power problems” on page 243.
- For intermittent problems, check the error log; see “Error logs” on page 133 and “Diagnostic programs and messages” on page 163.

Performing the checkout procedure

To perform the checkout procedure, complete the following steps:

1. Is the server part of a cluster?
 - **No:** Go to step 2.
 - **Yes:** Shut down all failing servers that are related to the cluster. Go to step 2.
2. Complete the following steps:
 - a. Make sure that both the ac and dc power supply LEDs on the rear of the power supply are lit, indicating that the power supply is operating correctly (see “Power supply LEDs” on page 161).
 - b. Turn off the server and all external devices.
 - c. Check all internal and external devices for compatibility at:
 - d. Check all cables and power cords.
 - e. Set all display controls to the middle positions.
 - f. Turn on all external devices.
 - g. Turn on the server. If the server does not start, see “Troubleshooting tables” on page 147.
 - h. Check the system-error LED on the front panel. If it is lit, check the LEDs on the system board (see “Error LEDs” on page 160).

Important: If the system-error LED on the front of the server is lit but there are no other error indications, clear the BMC system-event log. This log does not clear itself, and if it begins to fill up, the system-error LED will be lit. Also, after you complete a repair or correct an error, clear the BMC system-event log to turn off the system-error LED on the front of the server.

 - i. Check for the following results:
 - Successful completion of POST, indicated by one beep
 - Successful completion of startup
3. Did more than one beep sound, or was a POST error code displayed?
 - **Yes:** Find the beep code or error code in “POST beep codes” on page 130 or “POST error codes” on page 135; if necessary, see “Solving undetermined problems” on page 245.
 - **No:** Find the failure symptom in “Troubleshooting tables” on page 147; if necessary, run the diagnostic programs (see “Running the diagnostic programs” on page 164).
 - If you receive an error, see “Diagnostic messages” on page 165.
 - If the diagnostic programs were completed successfully and you still suspect a problem, see “Solving undetermined problems” on page 245.

Troubleshooting tables

Use the troubleshooting tables to find solutions to problems that have identifiable symptoms.

If you cannot find the problem in these tables, see “Running the diagnostic programs” on page 164 for information about testing the server.

If you have just added new software or a new optional device and the server is not working, complete the following steps before you use the troubleshooting tables:

1. Check the LEDs on the front panel or the system board (see “Error LEDs” on page 160).
2. Remove the software or device that you just added.
3. Run the diagnostic tests to determine whether the server is running correctly.
4. Reinstall the new software or new device.

CD or DVD drive problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The CD or DVD drive is not recognized.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The channel to which the CD or DVD drive is attached is enabled in the Configuration/Setup Utility program.• All cables and jumpers are installed correctly.• The signal cable and connector are not damaged and the connector pins are not bent.• The correct device driver is installed for the CD or DVD drive.2. Run the CD or DVD drive diagnostic programs.3. Reseat the CD or DVD drive cable.4. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. CD or DVD drive cableb. CD or DVD drivec. (Trained service technician only) System board
A CD or DVD is not working correctly.	<ol style="list-style-type: none">1. Clean the CD or DVD.2. Run the CD or DVD drive diagnostic programs.3. Reseat the CD or DVD drive cable.4. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. CD or DVD drive cableb. CD or DVD drive

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The CD or DVD drive tray is not working.	<ol style="list-style-type: none"> 1. Make sure that the server is turned on. 2. Insert the end of a straightened paper clip into the manual tray-release opening. 3. Reseat the CD or DVD drive cable. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. CD or DVD drive cable b. CD or DVD drive

Diskette drive problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The diskette drive activity LED stays lit, or the server bypasses the diskette drive.	<ol style="list-style-type: none"> 1. If there is a diskette in the drive, make sure that: <ul style="list-style-type: none"> • The diskette drive cables are correctly and securely connected. • The diskette drive is enabled in the Configuration/Setup Utility program. • The diskette is good and not damaged. (Try another diskette if you have one.) • The diskette is inserted correctly in the drive. • The diskette contains the necessary files to start the server. • Your software program is working properly. 2. To prevent diskette drive read/write errors, make sure that the distance between monitors and diskette drives is at least 76 mm (3 in.). 3. Replace the diskette drive.

General problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
A cover lock is broken, an LED is not working, or a similar problem has occurred.	If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician.

Hard disk drive problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
Not all drives are recognized by the hard disk drive diagnostic test (the Fixed Disk Test or the SCSI Attached Disk test).	Remove the drive that is indicated on the diagnostic tests; then, run the hard disk drive diagnostic test again. If the remaining drives are recognized, replace the drive that you removed with a new one.
The server stops responding during the hard disk drive diagnostic test.	Remove the hard disk drive that was being tested when the server stopped responding, and run the diagnostic test again. If the hard disk drive diagnostic test runs successfully, replace the drive that you removed with a new one.
A hard disk drive was not detected while the operating system was being started.	Reseat all hard disk drives and cables; then, run the hard disk drive diagnostic tests again.
A hard disk drive passes the diagnostic Fixed Disk Test but the problem remains.	Run the diagnostic SCSI Attached Disk test (see “Running the diagnostic programs” on page 164). Note: Use the SCSI Attached Disk test for drives that are part of RAID arrays. Use the Fixed Disk test for SATA drives that are not part of RAID arrays

Intermittent problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• All cables and cords are connected securely to the rear of the server and attached devices.• When the server is turned on, air is flowing from the fan grille. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down.2. Check the system event/error log (see “Error logs” on page 133).3. See “Solving undetermined problems” on page 245.

Keyboard, mouse, or pointing-device problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
All or some keys on the keyboard do not work.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The keyboard is compatible with the server. Go to:.• The keyboard cable is securely connected.• The server and the monitor are turned on.2. If you are using a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the 301 POST error message from being displayed during startup.3. If you are using a USB keyboard and it is connected to a USB hub, disconnect the keyboard from the hub and connect it directly to the server.4. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. Keyboardb. (Trained service technician only) System board

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The mouse or pointing device does not work.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The mouse is compatible with the server. Go to: • The mouse or pointing-device cable is securely connected to the server. • The mouse or pointing-device device drivers are installed correctly. • The server and the monitor are turned on. • The mouse option is enabled in the Configuration/Setup Utility program. 2. If you are using a USB mouse or pointing device and it is connected to a USB hub, disconnect the mouse or pointing device from the hub and connect it directly to the server. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Mouse or pointing device b. (Trained service technician only) System board

Memory problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The amount of system memory that is displayed is less than the amount of installed physical memory.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• No error LEDs are lit on the front-panel assembly or on the system board.• The memory modules are seated correctly.• You have installed the correct type of memory.• If you changed the memory, you updated the memory configuration in the Configuration/Setup Utility program.• All DIMMs are enabled. The server might have automatically disabled a DIMM when it detected a problem.• If a DIMM was disabled by a system-management interrupt (SMI), replace the DIMM.2. Check the POST error log for error message 289. If POST error message 289 is in the error log, perform the actions listed in the POST error codes table (see “POST error codes” on page 135). Otherwise, continue to step 3.3. Run memory diagnostics (see “Running the diagnostic programs” on page 164).4. Make sure that there is no memory mismatch when the server contains more than the minimum memory configuration (one 512 MB DIMM) and that you have installed the correct number of DIMMs (see the <i>User Guide</i> on the <i>ThinkServer Documentation DVD</i> for information about the supported DIMM configuration).5. Reseat the DIMMs.6. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. DIMMsb. (Trained service technician only) System board

Microprocessor problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The server emits a continuous beep during POST, indicating that the startup (boot) microprocessor is not working correctly.	<ol style="list-style-type: none">1. Make sure that the microprocessor is supported on this server.2. (Trained service technician only) Reseat the microprocessor.3. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. (Trained service technician only) Microprocessorb. (Trained service technician only) System board

Monitor or video problems

Some Lenovo monitors have their own self-tests. If you suspect a problem with your monitor, see the documentation that comes with the monitor for instructions for testing and adjusting the monitor.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
Testing the monitor	<ol style="list-style-type: none">1. Make sure that the monitor cables are firmly connected.2. Try using a different monitor on the server, or try using the monitor that is being tested on a different server.3. Run the diagnostic programs. If the monitor passes the diagnostic programs, the problem might be a video device driver.4. Reseat the Remote Supervisor Adapter II SlimLine adapter (if one is installed).5. Replace the Remote Supervisor Adapter II SlimLine adapter.6. (Trained service technician only) Replace the system board.
The screen is blank.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The server is turned on. If there is no power to the server, see “Power problems” on page 156.• The monitor cables are connected correctly.• The monitor is turned on and the brightness and contrast controls are adjusted correctly.• A single beep sounds when the server is turned on, indicating the successful completion of POST.2. Make sure that the correct server is controlling the monitor, if applicable.3. Make sure that damaged BIOS code is not affecting the video; see “Updating (flash-update) the BIOS code on the server” on page 232.4. See “Solving undetermined problems” on page 245.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The application program is not setting a display mode that is higher than the capability of the monitor. • You installed the necessary device drivers for the application. 2. Run video diagnostics (see “Running the diagnostic programs” on page 164). <ul style="list-style-type: none"> • If the server passes the video diagnostics, the video is good; see “Solving undetermined problems” on page 245. • (Trained service technician only) If the server fails the video diagnostics, replace the system board.
The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	<ol style="list-style-type: none"> 1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. Attention: Moving a color monitor while it is turned on might cause screen discoloration. Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor. Notes: <ol style="list-style-type: none"> a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.). b. Non-Lenovo monitor cables might cause unpredictable problems. 2. Reseat the monitor cable. 3. Reseat the Remote Supervisor Adapter II SlimLine adapter (if one is installed). 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Monitor b. Remote Supervisor Adapter II SlimLine adapter c. (Trained service technician only) System board
Wrong characters appear on the screen.	<ol style="list-style-type: none"> 1. If the wrong language is displayed, update the BIOS code with the correct language (see “Updating the firmware” on page 17). 2. Reseat the monitor cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Monitor b. (Trained service technician only) System board

Optional-device problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
An Lenovo optional device that was just installed does not work.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The device is designed for the server.• You followed the installation instructions that came with the device and the device is installed correctly.• You have not loosened any other installed devices or cables.• You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or any other device is changed, you must update the configuration.2. Reseat the device that you just installed.3. Replace the device that you just installed.
An Lenovo optional device that used to work does not work now.	<ol style="list-style-type: none">1. Make sure that all of the cable connections for the device are secure.2. If the device comes with test instructions, use those instructions to test the device.3. Reseat the failing device.4. Replace the failing device.

Power problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
<p>The power-control button does not work (the server does not start).</p> <p>Note: The power-control button will not function until 20 seconds after the server has been connected to ac power.</p>	<ol style="list-style-type: none"> 1. Make sure that the front-panel assembly power-control button is working correctly: <ol style="list-style-type: none"> a. Disconnect the server power cords. b. Reconnect the power cords. c. Press the power-control button. 2. Make sure that: <ul style="list-style-type: none"> • The power cords are correctly connected to the server and to a working electrical outlet. • The server contains the correct type of DIMMs. • The DIMMs are correctly seated. • The LEDs on the power supply do not indicate a problem. • The microprocessor is correctly installed. 3. Reseat the following components: <ol style="list-style-type: none"> a. DIMMs b. Power supply cables to all internal components c. Power supplies (hot-swap models) 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. DIMMs b. Power supplies (hot-swap models) c. (Trained service technician only) Power supply (non-hot swap models) 5. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports. 6. See “Power supply LEDs” on page 161. 7. See “Solving undetermined problems” on page 245.
The server does not turn off.	<ol style="list-style-type: none"> 1. Determine whether you are using an Advanced Configuration and Power Interface (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps: <ol style="list-style-type: none"> a. Press Ctrl+Alt+Delete. b. Turn off the server by holding the power-control button for 5 seconds. c. Restart the server. d. If the server fails POST and the power-control button does not work, disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server. 2. (Trained service technician only) If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.
The server unexpectedly shuts down, and the LEDs on the front-panel assembly are not lit.	See “Solving undetermined problems” on page 245.

Serial port problems

<ul style="list-style-type: none"> Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The number of serial ports that are identified by the operating system is less than the number of installed serial ports.	<ol style="list-style-type: none"> Make sure that: <ul style="list-style-type: none"> Each port is assigned a unique address in the Configuration/Setup Utility program and none of the serial ports is disabled. The serial-port adapter (if one is present) is seated correctly. Reseat the serial-port adapter. Replace the serial-port adapter.
A serial device does not work.	<ol style="list-style-type: none"> Make sure that: <ul style="list-style-type: none"> The device is compatible with the server. The serial port is enabled and is assigned a unique address. The device is connected to the correct connector (see “Connectors, LEDs, and jumpers” on page 10). Reseat the following components: <ol style="list-style-type: none"> Failing serial device Serial cable Remote Supervisor Adapter II SlimLine adapter (if one is present) Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> Failing serial device Serial cable Remote Supervisor Adapter II SlimLine adapter (if one is present) (Trained service technician only) System board

EasyStartup problems

<ul style="list-style-type: none"> Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The <i>ThinkServer EasyStartup</i> DVD will not start.	<ol style="list-style-type: none"> Make sure that the server supports the EasyStartup program and has a startable (bootable) CD or DVD drive. If the startup (boot) sequence settings have been changed, make sure that the CD or DVD drive is first in the startup sequence. If more than one CD or DVD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The ServeRAID Manager program cannot view all installed drives, or the operating system cannot be installed.	<ol style="list-style-type: none"> 1. Make sure that there are no duplicate IRQ assignments. 2. Make sure that the hard disk drive is connected correctly.
The operating-system installation program continuously loops.	Make more space available on the hard disk.
The EasyStartup program will not start the operating-system CD.	Make sure that the operating-system media is supported by the EasyStartup program.
The operating system cannot be installed; the option is not available.	Make sure that the server supports the operating system. If it does, either no logical drive is defined (RAID servers), or the EasyStartup program is not installed. Run the EasyStartup program and make sure that setup is complete.

Software problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
You suspect a software problem.	<ol style="list-style-type: none"> 1. To determine whether the problem is caused by the software, make sure that: <ul style="list-style-type: none"> • The server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software. If you have just installed an adapter or memory, the server might have a memory-address conflict. • The software is designed to operate on the server. • Other software works on the server. • The software works on another server. 2. If you receive any error messages while you use the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem. 3. Contact your place of purchase of the software.

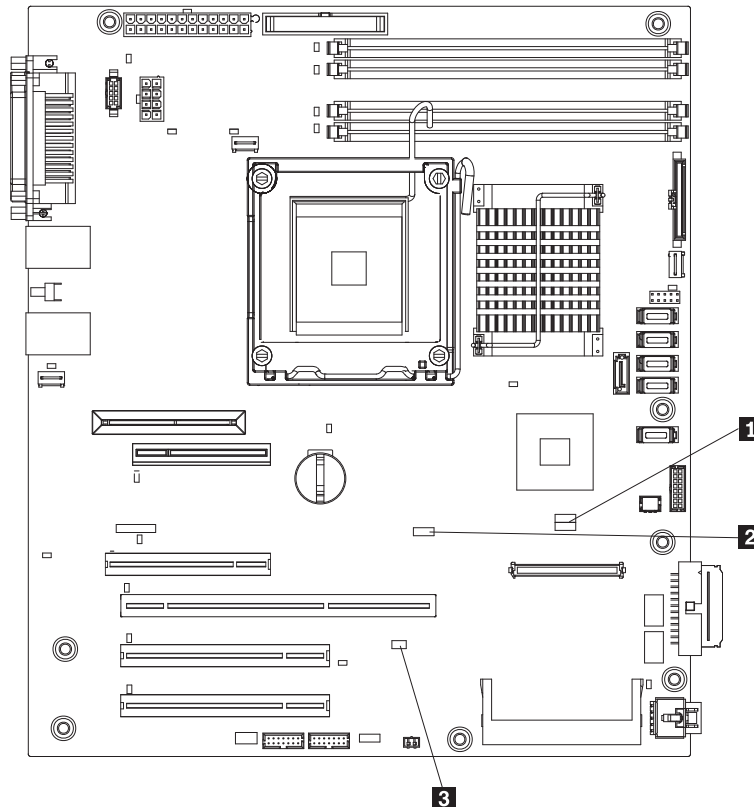
Universal Serial Bus (USB) port problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
A USB device does not work.	<ol style="list-style-type: none">1. Run the USB diagnostics (see “Running the diagnostic programs” on page 164.2. Make sure that:<ul style="list-style-type: none">• The correct USB device driver is installed.• The operating system supports USB devices.3. Make sure that the USB configuration options are set correctly in the Configuration/Setup Utility program. (For more information, see the <i>User Guide</i> on the <i>ThinkServer Documentation DVD</i>).4. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

Error LEDs

The following illustration shows the system board LEDs. The system board has error LEDs that will help to locate the source of the error. Run the diagnostic programs to find out the cause of the error (see “Running the diagnostic programs” on page 164).



- 1** Boot block jumper (JP6)
- 2** Clear CMOS jumper (JP1)
- 3** Mini-BMC force update jumper (JP3)

The server is designed so that LEDs remain lit when the server is connected to an ac power source but is not turned on, provided that the power supply is operating correctly. This feature helps you to isolate the problem when the operating system is shut down.

Many errors are first indicated by a lit system-error LED on the front-panel assembly of the server. If this LED is lit, one or more LEDs elsewhere in the server might also be lit and can direct you to the source of the error.

Important: If the system-error LED on the front of the server is lit but there are no other error indications, clear the BMC system-event log. This log does not clear itself, and if it begins to fill up, the system-error LED will be lit. Also, after you complete a repair or correct an error, clear the BMC system-event log to turn off the system-error LED on the front of the server.

Before you work inside the server to view the LEDs, read the safety information that begins on page vii and “Handling static-sensitive devices” on page 60.

If an error occurs, view the server LEDs in the following order:

1. Check the front-panel assembly on the front of the server. If the system-error LED is lit, it indicates that an error has occurred.
2. Check the front and rear of the server to determine whether any component LEDs are lit.
3. Remove the server cover and look inside the server for lit LEDs. Certain components inside the server have LEDs that will be lit to indicate the location of a problem. For example, a DIMM error will light the LED next to the failing DIMM on the system board.

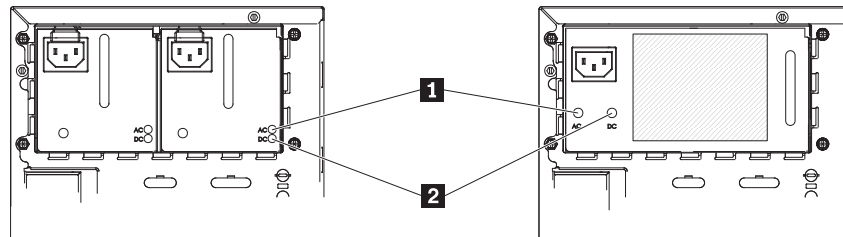
Look at the system service label on the top of the server, which gives an overview of internal components. This information can often provide enough information to correct the error.

Power supply LEDs

The following minimum configuration is required for the server to start:

- One microprocessor
- One 512 MB DIMM
- One power supply
- Power backplane
- Power cord
- System board

The following is an illustration of the connectors, AC power supply LED **1**, and DC power supply LED **2** on the rear of the hot-swap and non-hot-swap server models.



The following table describes the problems that are indicated by various combinations of the power supply LEDs and the power-on LED on the front information panel and suggested actions to correct the detected problems.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 				
power supply LEDs		Front information panel power-on LED	Description	Action
AC	DC			
Off	Off	Off	No power to the server, or a problem with the ac power source.	<ol style="list-style-type: none"> 1. Check the ac power to the server. 2. Make sure that the power cord is connected to a functioning power source. 3. Remove one power supply at a time.
Lit	Off	Off	DC source or power supply power problem.	<ol style="list-style-type: none"> 1. Make sure that the power supply is connected to the power backplane. 2. Remove and replace one power supply at a time. 3. View the system-error log (see “Error logs” on page 133).
Lit	Lit	Off	Standby power problem.	<ol style="list-style-type: none"> 1. View the system-error log (see “Error logs” on page 133). 2. Remove one power supply at a time. 3. (Trained service technician only) Replace the power backplane.
Lit	Lit	Flashing	System power-on problem.	<ol style="list-style-type: none"> 1. View the system-error log (see “Error logs” on page 133). 2. Make sure that the power cables are seated correctly. 3. Press the power-control button on the control-panel. 4. Remove the optional Remote Supervisor Adapter II SlimLine, and try to turn on the server. 5. (Trained service technician only) Reseat the system board. 6. (Trained service technician only) Replace the system board.
Lit	Lit	Lit	The power is good.	No action is necessary.

Diagnostic programs and messages

The diagnostic programs are the primary method of testing the major components of the server. The diagnostic tools provided with the program include a system information collection and analysis tool that you can use to provide information to Lenovo service and support to aid in the diagnosis of the system problems. The diagnostic programs are provided on the *Diagnostics CD*. If one did not come with your server, you can download the CD from the Lenovo Support site. As you run the diagnostic programs, text messages are displayed on the screen and are saved in the test log. A diagnostic text message indicates that a problem has been detected and indicates what action you should take as a result of the text message.

The diagnostic programs collect information about the following aspects of system:

- System configuration
- Network interfaces and settings
- Hardware inventory, including PCI and USB information
- Lenovo Easy LED Diagnostics status
- Service processor status and configuration
- Vital product data, firmware, and basic input/output system (BIOS)
- Drive health information
- ServeRAID configuration
- LSI RAID and controller configuration
- Event logs for ServeRAID controllers and service processors

The diagnostic programs can also provide diagnostics for the following system components, if they are installed in the system:

- BroadCom NetXtreme II
- Optical (CD or DVD) drives
- Hard disk drives
- LSI 1064e/1068e/1078e SAS RAID controller
- Remote Supervisor Adapter
- Baseboard management controller
- Trusted Platform Module chip
- Memory
- Microprocessor
- Checkpoint panel test

The diagnostic programs create a merged log called the diagnostic error log, which includes events from all collected logs. You can output all of the collected information as a compressed XML file that you can send to Lenovo service and support, view the information locally through a generated text report file, or copy the log to a removable media and view the log from a Web browser. See “Running the diagnostic programs” on page 164 for more information.

Make sure that the latest version of the diagnostic programs is installed. To download the latest version of the diagnostic programs, go to the Lenovo Support Web site.

Running the diagnostic programs

Important: The diagnostic programs do not support USB CD-ROM drives. If you run the diagnostic programs while any USB CD-ROM drives are attached, ignore any optical drive test results that are returned for USB CD-ROM drives. You can also remove USB CD-ROM drives before you run the diagnostic programs to get accurate optical drive test results. To remove a remotely mounted USB CD-ROM drive, you might have to unmount the remote disk through the Remote Supervisor Adapter II Web interface.

To run the Preboot diagnostic programs, complete the following steps:

1. If the server is running, turn off the server and all attached devices.
2. Turn on all attached devices; then, turn on the server.
3. When the prompt Press F1 For Configuration/Setup, appears press F1.
4. From the Configuration/Setup Utility menu, select **Start Options**.
5. From the **Start Options** menu, select **Startup Sequence Options**.
6. Note the device that is selected as the first startup device. Later, you must restore this setting.
7. Select **CD/DVD-ROM** as the first startup device.
8. Press Esc two times to return to the Configuration/Setup Utility menu.
9. Insert the *Diagnostics CD* into the CD or DVD drive.
10. Select **Save & Exit Setup** and follow the prompts. The diagnostic programs start.
11. From the diagnostic programs screen, select the test that you want to run, and follow the instructions on the screen.

Follow the actions in the “Diagnostic messages” on page 165 to solve the problem.

If the diagnostic programs do not detect any hardware errors but the problem remains during normal server operations, a software error might be the cause. If you suspect a software problem, see the information that comes with your software.

A single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run the diagnostic programs.

Exception: If multiple error codes or LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 153 for information about diagnosing microprocessor problems.

If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again. If the problem remains, replace the component that was being tested when the server stopped.

Diagnostic text messages

Diagnostic text messages are displayed while the tests are running. A diagnostic text message contains one of the following results:

Passed: The test was completed without any errors.

Failed: The test detected an error.

Aborted: The test could not proceed because of the server configuration.

Viewing the test log

You can use one of the following methods to access the test log when the tests are completed:

- From the DSA command line (Diagnostic command line), issue the **view** command or select **Diagnostic Event Log** from the DSA graphical user interface (GUI).
- From the DSA interactive menu, select **getextendedresults**.
- From the DSA interactive menu, select **view** to view all of the collected results and error log data.
- In the DSA GUI, select **DSA Error Log** from the System Information page.

You can send the Diagnostic error log file to Lenovo service and support to aid in diagnosing the server problems or you can use the Diagnostic CLI **copy** command to copy the log to an external USB device.

Diagnostic messages

The following table describes the messages that the diagnostic programs might generate and suggested actions to correct the detected problems. Follow the suggested actions in the order in which they are listed in the action column.

Important: The diagnostic programs do not support USB CD-ROM drives. If you run the diagnostic programs while any USB CD-ROM drives are attached, ignore any optical drive test results that are returned for USB CD-ROM drives. You can also remove USB CD-ROM drives before you run the diagnostic programs to get accurate optical drive test results. To remove a remotely mounted USB CD-ROM drive, you might have to unmount the remote disk through the Remote Supervisor Adapter II Web interface.

Table 12. Diagnostic messages

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
089-801-xxx	CPU	CPU Stress Test	Aborted	Internal program error.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, use the EasyUpdate program or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 5. Run the test again. 6. If the system has stopped responding, turn off and restart the system. 7. Run the test again. 8. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.
089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, use EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 5. Run the test again. 6. If the system has stopped responding, turn off and restart the system. 7. Run the test again. 8. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
089-803-xxx	CPU	CPU Stress Test	Aborted	Memory size is insufficient to run the test. At least 1 GB is required.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, use EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 5. Run the test again. 6. If the system has stopped responding, turn off and restart the system. 7. Run the test again. 8. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
089-901-xxx	CPU	CPU Stress Test	Failed	Test failure.	<ol style="list-style-type: none"> 1. If the system has stopped responding, turn off and restart the system and then run the test again. 2. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, start EasyUpdate or go to: http://www.lenovo.com/support. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 5. Run the test again. 6. If the system has stopped responding, turn off and restart the system. 7. Run the test again. 8. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
165-801-xxx	Remote Supervisor Adapter	RSA Restart Test	Aborted	Remote Supervisor Adapter restart test failure with reason: no service processor was found.	<ol style="list-style-type: none"> 1. Make sure that Linux is selected in Advanced Setup → RSA II Settings → OS USB Selection in the Configuration/Setup Utility program (press F1 at system startup). 2. Make sure that the Remote Supervisor Adapter II SlimLine firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 3. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 4. Run the test again. 5. Turn off the system and disconnect it from the power source. 6. Reseat the Remote Supervisor Adapter II SlimLine. 7. Reconnect the system to the power source and turn on the system. 8. Run the test again. 9. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
165-902-xxx	Remote Supervisor Adapter	RSA Restart Test	Failed	Remote Supervisor Adapter restart test failure with reason: the Remote Supervisor Adapter restart command was not sent successfully.	<ol style="list-style-type: none"> 1. Make sure that Linux is selected in Advanced Setup → RSA II Settings → OS USB Selection in the Configuration/Setup Utility program (press F1 at system startup). 2. Make sure that the Remote Supervisor Adapter II SlimLine firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 3. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 4. Run the test again. 5. Turn off the system and disconnect it from the power source. 6. Reseat the Remote Supervisor Adapter II SlimLine. 7. Reconnect the system to the power source and turn on the system. 8. Run the test again. 9. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
165-903-xxx	Remote Supervisor Adapter	RSA Restart Test	Failed	Remote Supervisor Adapter restart test failure with reason: the Remote Supervisor Adapter did not restart.	<ol style="list-style-type: none"> 1. Make sure that Linux is selected in Advanced Setup → RSA II Settings → OS USB Selection in the Configuration/Setup Utility program (press F1 at system startup). 2. Make sure that the Remote Supervisor Adapter II SlimLine firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 3. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 4. Run the test again. 5. Turn off the system and disconnect it from the power source. 6. Reseat the Remote Supervisor Adapter II SlimLine. 7. Reconnect the system to the power source and turn on the system. 8. Run the test again. 9. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
165-904-xxx	Remote Supervisor Adapter	RSA Restart Test	Failed	Remote Supervisor Adapter restart test failure with reason: the Remote Supervisor Adapter cannot wake up from the restart process.	<ol style="list-style-type: none"> 1. Make sure that Linux is selected in Advanced Setup → RSA II Settings → OS USB Selection in the Configuration/Setup Utility program (press F1 at system startup). 2. Make sure that the Remote Supervisor Adapter II SlimLine firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 3. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 4. Run the test again. 5. Turn off the system and disconnect it from the power source. 6. Reseat the Remote Supervisor Adapter II SlimLine. 7. Reconnect the system to the power source and turn on the system. 8. Run the test again. 9. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
165-905-xxx	Remote Supervisor Adapter	RSA Restart Test	Failed	Remote Supervisor Adapter restart test failure with reason: cannot restart the Remote Supervisor Adapter because of no communication with the service processor.	<ol style="list-style-type: none"> 1. Make sure that Linux is selected in Advanced Setup → RSA II Settings → OS USB Selection in the Configuration/Setup Utility program (press F1 at system startup). 2. Make sure that the Remote Supervisor Adapter II SlimLine firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 3. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 4. Run the test again. 5. Turn off the system and disconnect it from the power source. 6. Reseat the Remote Supervisor Adapter II SlimLine. 7. Reconnect the system to the power source and turn on the system. 8. Run the test again. 9. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-801-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: the BMC returned an incorrect response length.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting to Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-802-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: the test cannot be completed for an unknown reason.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-803-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: the node is busy; try later.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-804-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: invalid command.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-805-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: invalid command for the given LUN.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-806-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: timeout while processing the command.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-807-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: out of space.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-808-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: reservation canceled or invalid reservation ID.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-809-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: request data was truncated.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-810-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: request data length is invalid.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-811-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: request data field length limit is exceeded.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-812-xxx	BMC	BMC I2C Test	Aborted	BMC I2C Test canceled a parameter is out of range.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, go to: http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-813-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: cannot return the number of requested data bytes.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-814-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: requested sensor, data, or record is not present.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-815-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: invalid data field in the request.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-816-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: the command is illegal for the specified sensor or record type.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-817-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: a command response could not be provided.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-818-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: cannot execute a duplicated request.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-819-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: a command response could not be provided; the SDR repository is in update mode.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-820-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: a command response could not be provided; the device is in firmware update mode.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-821-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: a command response could not be provided; BMC initialization is in progress.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-822-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: the destination is unavailable.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-823-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: cannot execute the command; insufficient privilege level.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-824-xxx	BMC	BMC I2C Test	Aborted	BMC I2C test canceled: cannot execute the command.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-901-xxx	BMC	BMC I2C Test	Failed	BMC indicates a failure in the IPMB bus	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. Remove power from the system. 8. (Trained service technician only) Reseat the system board. 9. Reconnect the system to power and turn on the system. 10. Run the test again. 11. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-902-xxx	BMC	BMC I2C Test	Failed	BMC indicates a failure in the sensor bus	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. Remove power from the system. 8. (Trained service technician only) Reseat the system board. 9. Reconnect the system to power and turn on the system. 10. Run the test again. 11. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-903-xxx	BMC	BMC I2C Test	Failed	BMC indicates a failure in the Ethernet sideband bus.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Make sure that the Ethernet device firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 7. Run the test again. 8. Remove power from the system. 9. (Trained service technician only) Reseat the system board. 10. Reconnect the system to power and turn on the system. 11. Run the test again. 12. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-904-xxx	BMC	BMC I2C Test	Failed	BMC indicates a failure in the power backplane bus.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. Remove power from the system. 8. Reseat the power backplane. 9. (Trained service technician only) Reseat the system board. 10. Reconnect the system to power and turn on the system. 11. Run the test again. 12. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-905-xxx	BMC	BMC I2C Test	Failed	BMC indicates a failure in the hard disk drive (DASD) bus.	<p>Ignore this error if the hard disk drive backplane is not installed. Otherwise, complete the following steps:</p> <ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. Remove power from the system. 8. Reseat all connections in the hard disk subsystem, which can include hard disk drives, SCSI or SAS cables, a hard disk backplane, and a hard disk drive or RAID controller. 9. (Trained service technician only) Reseat the system board. 10. Reconnect the system to power and turn on the system. 11. Run the test again. 12. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
166-906-xxx	BMC	BMC I2C Test	Failed	BMC indicates a failure in the private bus.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the BMC. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BMC firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. Remove power from the system. 8. (Trained service technician only) Reseat the system board. 9. Reconnect the system to power and turn on the system. 10. Run the test again. 11. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
201-801-xxx	Memory	Memory Test	Aborted	Test canceled: the system BIOS programmed the memory controller with an invalid CBAR address	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 4. Run the test again. 5. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
201-802-xxx	Memory	Memory Test	Aborted	Test canceled: the end address in the E820 function is less than 16 MB.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that all DIMMs are enabled in the Configuration/Setup Utility program (press F1 at system startup). 4. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 5. Run the test again. 6. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
201-803-xxx	Memory	Memory Test	Aborted	Test canceled: could not enable the processor cache.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 4. Run the test again. 5. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
201-804-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer request failed.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 4. Run the test again. 5. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
201-805-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller display/alter write operation was not completed.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 4. Run the test again. 5. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
201-806-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller fast scrub operation was not completed.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 4. Run the test again. 5. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
201-807-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer free request failed.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 4. Run the test again. 5. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
201-808-xxx	Memory	Memory Test	Aborted	Test canceled: memory controller display/alter buffer execute error.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 4. Run the test again. 5. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
201-809-xxx	Memory	Memory Test	Aborted	Test canceled program error: operation running fast scrub.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 4. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 5. Run the test again. 6. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
201-810-xxx	Memory	Memory Test	Aborted	Test canceled: unknown error code xxx received in COMMONEXIT procedure.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 4. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 5. Run the test again. 6. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
201-901-xxx	Memory	Memory Test	Failed	Test failure: single-bit error, failing bank x, failing DIMM z.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. 2. Reseat DIMM z. 3. Reconnect the system to the power source and turn on the system. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. Replace the failing DIMMs. 8. Re-enable all memory in the Configuration/Setup Utility program (press F1 at system startup). 9. Run the test again. 10. Replace the failing DIMM. 11. Re-enable all memory in the Configuration/Setup Utility program (press F1 at system startup). 12. Run the test again. 13. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
201-902-xxx	Memory	Memory Test	Failed	Test failure: single-bit and multi-bit error, failing bank x, failing DIMM z	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. 2. Reseat DIMM z. 3. Reconnect the system to the power source and turn on the system. 4. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 5. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. Replace the failing DIMMs. 8. Re-enable all memory in the Configuration/Setup Utility program (press F1 at system startup). 9. Run the test again. 10. Replace the failing DIMMs. 11. Re-enable all memory in the Configuration/Setup Utility program (press F1 at system startup). 12. Run the test again. 13. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
202-801-xxx	Memory	Memory Stress Test	Aborted	Internal program error.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 3. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 4. Run the test again. 5. Turn off and restart the system if necessary to recover from a hung state. 6. Run the memory diagnostics to identify the specific failing DIMM. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
202-802-xxx	Memory	Memory Stress Test	Aborted	Memory size is insufficient to run the test. At least 1 GB is required.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Make sure that all memory is enabled by checking the Available System Memory in the Resource Utilization section of the Diagnostic event log. If necessary, enable all memory in the Configuration/Setup Utility program (press F1 at system startup). 3. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 4. Make sure that the BIOS code is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 5. Run the test again. 6. Turn off and restart the system if necessary to recover from a hung state. 7. Run the memory diagnostics to identify the specific failing DIMM. 8. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
202-901-xxx	Memory	Memory Stress Test	Failed	Test failure.	<ol style="list-style-type: none"> 1. Run the standard Diagnostic memory diagnostic to validate all memory. 2. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 3. Turn off the system and disconnect it from power. 4. Reseat the DIMMs. 5. Reconnect the system to power and turn on the system. 6. Run the test again. 7. Run the standard Diagnostic memory diagnostic to validate all memory. 8. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
202-902-xxx	Memory	Memory Stress Test	Failed	General error: memory size is insufficient to run the test.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Make sure that all memory is enabled by checking the Available System Memory in the Resource Utilization section of the Diagnostic event log. If necessary, enable all memory in the Configuration/Setup Utility program (press F1 at system startup). 3. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 4. Run the test again. 5. Turn off and restart the system if necessary to recover from a hung state. 6. Run the standard Diagnostic memory diagnostic to validate all memory. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
215-801-xxx	Optical drive	Self-Test	Aborted	Unable to communicate with the device driver.	<ol style="list-style-type: none"> 1. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 2. Run the test again. 3. Check the drive cabling for loose or broken connections at both ends or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
215-802-xxx	Optical drive	Self-Test	Aborted	The media tray is open.	<ol style="list-style-type: none"> 1. Close the media tray and wait 15 seconds for the media to be recognized.. 2. Run the test again. 3. Insert a new CD or DVD into the drive, and wait for 15 seconds for the media to be recognized. 4. Run the test again. 5. Check the drive cabling for loose or broken connections at both ends or damage to the cable. Replace the cable if it is damaged. 6. Run the test again. 7. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 8. Run the test again. 9. Replace the optical drive. 10. Run the test again. 11. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
215-803-xxx	Optical drive	Self-Test	Failed	The disc might be in use by the system.	<ol style="list-style-type: none"> Wait for the system activity to stop. Run the test again. Turn off and restart the system. Run the test again. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.
215-901-xxx	Optical drive	Self-Test	Aborted	Drive media is not detected.	<ol style="list-style-type: none"> Insert a new CD or DVD into the drive and wait for 15 seconds for the media to be recognized. Run the test again. Check the drive cabling for loose or broken connections at both ends or damage to the cable. Replace the cable if it is damaged. Run the test again. Replace the optical drive. Run the test again. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.
215-902-xxx	Optical drive	Self-Test	Failed	Read miscompare.	<ol style="list-style-type: none"> Insert a new CD or DVD into the drive and wait for 15 seconds for the media to be recognized. Run the test again. Check the drive cabling for loose or broken connections at both ends or damage to the cable. Replace the cable if it is damaged. Run the test again. Replace the optical drive. Run the test again. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
215-903-xxx	Optical drive	Self-Test	Aborted	Could not access the drive.	<ol style="list-style-type: none"> 1. Insert a new CD or DVD into the drive and wait for 15 seconds for the media to be recognized. 2. Run the test again. 3. Check the drive cabling for loose or broken connections at both ends or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. Make sure that the Diagnostic code is at the latest level. For the latest level of Diagnostic code, go to: http://www.lenovo.com/support. 6. Run the test again. 7. Replace the optical drive. 8. Run the test again. 9. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
215-904-xxx	Optical drive	Self-Test	Failed	A read error occurred.	<ol style="list-style-type: none"> 1. Insert a new CD or DVD into the drive and wait for 15 seconds for the media to be recognized. 2. Run the test again. 3. Check the drive cabling for loose or broken connections at both ends or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. Replace the optical drive. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.
405-901-xxx	Broadcom Ethernet device	TestControlRegisters	Failed		<ol style="list-style-type: none"> 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 2. Run the test again. 3. (Trained service technician only) Replace the system board. 4. Run the test again. 5. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
405-902-xxx	Broadcom Ethernet device	TestMIIRegisters	Failed		<ol style="list-style-type: none"> 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 2. Run the test again. 3. (Trained service technician only) Replace the system board. 4. Run the test again. 5. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
405-903-xxx	Broadcom Ethernet device	TestEEPROM	Failed		<ol style="list-style-type: none"> 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 2. Run the test again. 3. (Trained service technician only) Replace the system board. 4. Run the test again. 5. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
405-904-xxx	Broadcom Ethernet device	TestInternalMemory	Failed		<ol style="list-style-type: none"> 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 2. Run the test again. 3. (Trained service technician only) Replace the system board. 4. Run the test again. 5. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
405-905-xxx	Broadcom Ethernet device	TestInterrupt	Failed		<ol style="list-style-type: none"> 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the Diagnostic event log. If the Ethernet device is sharing interrupts, if possible, use the Configuration/Setup Utility program (press F1 at system startup) to assign a unique interrupt to the device. 4. Run the test again. 5. (Trained service technician only) Replace the system board. 6. Run the test again. 7. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
405-906-xxx	Broadcom Ethernet device	TestLoopbackAtMAC-Layer	Failed		<ol style="list-style-type: none"> 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 2. Run the test again. 3. (Trained service technician only) Replace the system board. 4. Run the test again. 5. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
405-907-xxx	Broadcom Ethernet device	TestLoopbackAtPhysicalLayer	Failed		<ol style="list-style-type: none"> 1. Check the Ethernet cable for damage and make sure that the cable type and connection are correct. 2. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 3. Run the test again. 4. (Trained service technician only) Replace the system board. 5. Run the test again. 6. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Table 12. Diagnostic messages (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 					
Message number	Component	Test	State	Description	Action
405-908-xxx	Broadcom Ethernet device	TestLEDs	Failed		<ol style="list-style-type: none"> 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the Diagnostic event log in the Firmware/VPD section for this component. For the latest level of firmware, start firmware, go to EasyUpdate or go to: http://www.lenovo.com/support and select your system to display a matrix of available firmware. 2. Run the test again. 3. (Trained service technician only) Replace the system board. 4. Run the test again. 5. If the problem remains, collect the data from the Diagnostic event log and send it to Lenovo Service. For information about contacting Lenovo Service, see http://www.lenovo.com/support.

Updating (flash-update) the BIOS code on the server

Periodically, Lenovo makes new levels of BIOS code available on the Web. Always check <http://www.lenovo.com/support> for the latest level of BIOS code, device drivers, documentation, and hints and tips. You can use one of the following methods to update (flash-update) the BIOS code on the server:

- Download the BIOS code update file directly to the hard disk drive.
- Download the BIOS code update file to a diskette (you must attach an optional external USB portable diskette drive to the server); then, update the BIOS code on the server.
- Download the BIOS code update file to a CD or DVD, using a writable optional device; then, start the server with the CD or DVD in the CD or DVD drive to update the BIOS code on the server.

One file type is available for each of these methods. The description next to each file indicates the type of medium to which you can download the file. A readme file is also available with instructions for installing the BIOS code update.

To download the BIOS (flash) update files, complete the following steps.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to: <http://www.lenovo.com/support>.
2. Select **Servers** from the **Brand** list.
3. Enter your product number (machine type and model number) or select **Servers** from the **Select your product** list.
4. From **Family** list, select **ThinkServer TS100**, and click **Continue**.
5. Click **Downloads and drivers** to download firmware updates.
6. Select the applicable file for your operating system and the file type for the medium you want to use; then, download the flash BIOS update.
7. Update the BIOS code. Follow the readme instructions that come with the update file that you downloaded.

Note: Always reset the Configuration/Setup Utility program to the default values after you update the BIOS code.

8. Restart the server.

Recovering from a BIOS update failure

If power to the server is interrupted while BIOS code is being updated, the server might not restart correctly or might not display video. If this happens, use the procedure in this section to recover the BIOS code.

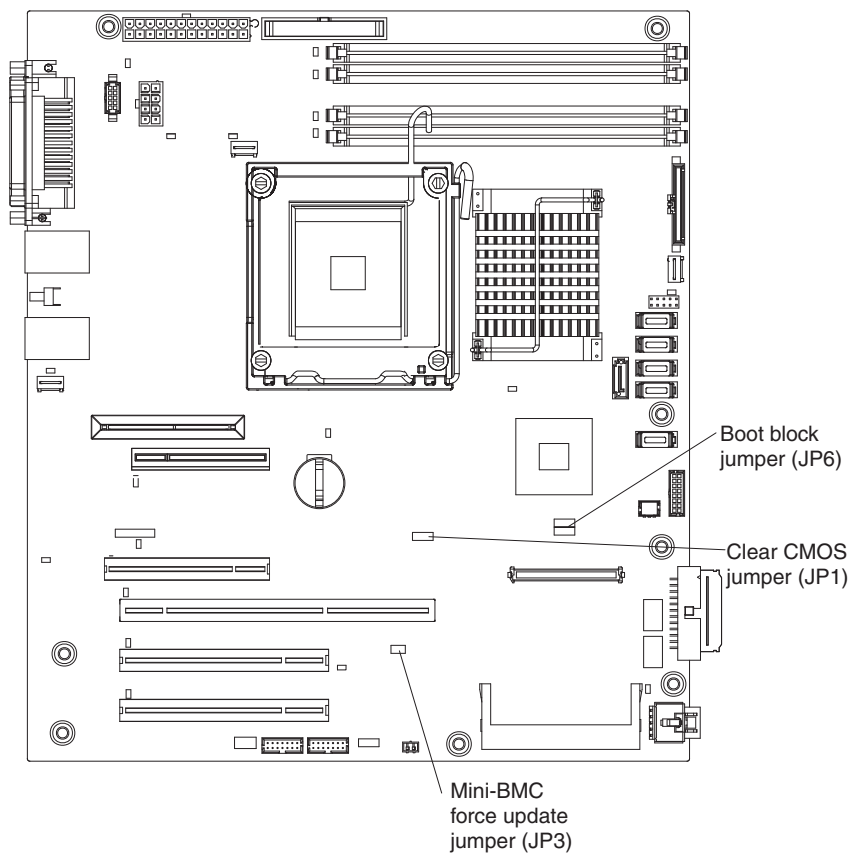
To complete the procedures in this section, you must make the following preparations:

- Download the BIOS code image to create the POST/BIOS recovery diskette, CD, or DVD from <http://www.lenovo.com/support>.
- To create and use a diskette, you must attach an optional external USB diskette drive to the server. To enable the USB diskette drive, complete the following steps:
 1. Enable the **USB Support** option in the **Devices and I/O Ports** menu in the Configuration/Setup Utility program.

2. Set your removable media device as the first startup device.
3. Select the removable media device that you want to boot from and move it to the top of the list.

To recover the BIOS code, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 57.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 62).
4. Locate the boot block recovery jumper (JP6) on the system board (see the following illustration) and remove any adapters that impede access to the jumper (see “Removing an adapter” on page 68).



5. Move the boot block recovery jumper to pins 2 and 3.
6. Replace any adapters that you removed (see “Installing an adapter” on page 69); then, install the side cover (see “Installing the side cover” on page 63).
7. Reconnect all external cables and power cords.
8. Insert the update diskette, CD, or DVD into the diskette, CD, or DVD drive.
9. Turn on the server and the monitor.
After the update session is completed, remove the diskette, CD, or DVD from the drive and turn off the server.
10. Disconnect all power cords and external cables.
11. Remove the side cover (see “Removing the side cover” on page 62).

12. Remove any adapters that impede access to the boot block recovery jumper (see “Removing an adapter” on page 68).
13. Return the boot block recovery jumper to pins 1 and 2.
14. Replace any adapters that you removed (see “Installing an adapter” on page 69); then, install the side cover (see “Installing the side cover” on page 63).
15. Lock the side cover.
16. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

System-error log messages

A system-error log is generated by both the Remote Supervisor Adapter II SlimLine adapter and the mini-BMC. The system-error log can contain messages of three types:

- Information** Information messages do not require action; they record significant system-level events, such as when the server is started.
- Warning** Warning messages do not require immediate action; they indicate possible problems, such as when the recommended maximum ambient temperature is exceeded.
- Error** Error messages might require action; they indicate system errors, such as when a fan is not detected.

Each message contains date and time information, and it indicates the source of the message (POST/BIOS or the service processor).

In the following example, the system-error log message indicates that the server was turned on at the recorded time.

```
-----  
Date/Time: 2002/05/07 15:52:03  
DMI Type:  
Source: SERVPROC  
Error Code: System Complex Powered Up  
Error Code:  
Error Data:  
Error Data:  
-----
```

The following table describes the possible system-error log messages and suggested actions to correct the detected problems.

<ul style="list-style-type: none">• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.• See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.	
System-error log message	Action
A system NMI was detected	Make sure that the system software is operating correctly and does not conflict with other software; the system software has created a software NMI, or pressing the NMI button has created a service NMI.
Alert accepted by remote system x; type:y, ID:z	Information only.
Alert accepted from system x; type:y, sender's ID:z	Information only.
Alert ID x will be retried by sender; when accepted by a remote system, it will have a different ID	Information only.
Alert not accepted by remote system x; type:y, ID:z	Information only.
Alert not accepted from system x; type:y, sender's ID:z	Information only.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

System-error log message	Action
ASM Reset -- reason unknown	Information only.
ASM Reset due to x, Instruction Fault: y	Information only.
ASM Reset due Watchdog timeout	Information only.
ASM Reset was caused by restoring default values	Information only.
ASM Reset was initiated by the user	Information only.
Configuration error recovery on the Inter-connect network	Information only.
CPU over temperature	<ol style="list-style-type: none"> 1. Make sure that the fan sink has good airflow and is not obstructed. 2. Reseat the following components: <ol style="list-style-type: none"> a. Fan-sink cable b. (Trained service technician only) Fan sink
DASD controller removal	<ol style="list-style-type: none"> 1. Make sure that the mini-PCI-X adapter cable is not damaged. 2. Reseat the mini-PCI-X adapter cable. 3. Replace the mini-PCI-X adapter cable.
DHCP failure,no IP@ assigned-RETRYING!,rc=xxx,count=yyy	Information only.
Dialback failed for userid w. Could not connect at phone number x, y, z	Information only.
ENET[eee] DHCP-HstNme=a,DN=b,IP@=ccc.ccc.ccc.ccc GW@=ddd.ddd.ddd.ddd, NMask=fff.fff.fff.fff, DNS1@=ggg.ggg.ggg.ggg, DNS2@=hhh.hhh.hhh.hhh	Information only.
ENET[eee] IP-Cfg:HstName=x, IP@=ccc.ccc.ccc.ccc, GW@=ddd.ddd.ddd.ddd, NetMsk=fff.fff.fff.fff	Information only.
Failure reading an I2C device, possible bus failure	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. AC power cords b. Hot-swap power supplies, if any are installed c. Power-supply cables on the system board 2. (Trained service technician only) Replace the system board.
Fan x Failure	<ol style="list-style-type: none"> 1. Make sure that fan x is not obstructed. 2. Reseat the fan x cable. 3. Replace fan x.
Fan x Outside Recommended Speed	<ol style="list-style-type: none"> 1. Make sure that fan x is not obstructed. 2. Reseat the fan x cable. 3. Replace fan x.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

System-error log message	Action
Flash of x by y via z was successful.w	Information only.
Flash of x via z failed for user z...z	Information only.
Flash succeeded for x (address: y)	Information only.
Hard Drive x Fault	<ol style="list-style-type: none"> 1. Run the diagnostic programs. 2. Replace hard disk drive x. 3. Replace the following component, depending on the server model: <ul style="list-style-type: none"> • Hot-swap models: Hard disk drive backplane • Simple-swap models: Hard disk drive x cable
Hard drive x removal detected.	Reseat the following component, depending on the server model: <ul style="list-style-type: none"> • Hot-swap and simple-swap models: Hard disk drive x
Internal Error CPU Fault	Information only. If the message remains: <ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. (Trained service technician only) Replace the microprocessor.
Invalid userid or password received. Userid is w, x, y, z	Information only.
LAN: Command Mode tamper triggered. Possible break in attempt	Information only.
LAN: Telnet tamper triggered. Possible break in attempt	Information only.
LAN: Web Server tamper delay triggered. Possible break in attempt	Information only.
LAN: Ethernet interface is no longer active	Information only.
LAN: Ethernet interface is now active	Information only.
No ISMP Gateway defined for the interconnect network. RSA x is Assuming the Gateway	Information only.
OS Watchdog response disabled by x	Information only.
OS Watchdog response enabled by x	Information only.
PFA Alert, see preceding error in system error log	Information only. See the preceding entry in the system-error log.
Possible ASM reset occurred -- reason unknown	Information only.
Power off	Information only.
Power on	Information only.
PPP[xxx] PPP-Cfg, Local-IP@=aaa.aaa.aaa.aaa, Remote-IP@=bbb.bbb.bbb.bbb NetMsk=ccc.ccc.ccc.ccc, Auth=ddd	Information only.
PPP_1:Client Connected at xxx bps	Information only.
PPP_1:User requested to abort PPP interface	Information only.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

System-error log message	Action
Received alert from system x; type:y, sender's ID:z	Information only.
Remote access attempt failed	Information only.
Remote access attempt failed. Invalid userid or password received. Userid is 'x' from WEB browser at IP@=yyy.yyy.yyy.yyy	Information only.
Remote access attempt failed. Invalid userid or password received. Userid is 'x' from CMD mode client at IP@=yyy.yyy.yyy.yyy	Information only.
Remote access attempt failed. Invalid userid or password received. Userid is 'x' from TELNET client at IP@=yyy.yyy.yyy.yyy	Information only.
Remote Login Successful. Login ID:	Information only.
Remote Login Successful. Login ID:'x' from CMD mode client at IP@=yyy.yyy.yyy.yyy	Information only.
Retried alert accepted from system x; type:y, sender's ID:z	Information only.
Retry count exceeded. Incorrect password entered too many times for userid w, x, y, z	Information only.
RS485 broadcast from x ignored; more than y devices present on the RS485 network	Information only.
RS485 connection to system x has ended	Information only.
RS485 network overload has cleared; x or fewer devices are present on the RS485 network	Information only.
RSA x Became the ISMP Gateway	Information only.
Running the backup ASM main application	Information only.
Secondary Device Event[00 x UNKNOWN-y]	Information only.
Sending alert to remote system x; type:y, ID:z	Information only.
Serial tamper delay triggered. Possible serial port break in attempt	Information only.
System board is over recommended temperature	<ol style="list-style-type: none"> 1. Make sure that the fans have good airflow and are not obstructed. 2. (Trained service technician only) Replace the system board.
System board is under recommended temperature	<ol style="list-style-type: none"> 1. Make sure that the fans have good airflow and are not obstructed. 2. (Trained service technician only) Replace the system board.
System Complex Powered Down	Information only.
System error log full	Clear the current logs.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

System-error log message	Action
System is over recommended voltage for +3.3V	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System is over recommended voltage for 1.5V CPU	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System is over recommended voltage on VRM	(Trained service technician only) Reseat the microprocessor.
System is under recommended voltage for +3.3V	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System is under recommended voltage for 1.5V CPU	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System is under recommended voltage on VRM	(Trained service technician only) Reseat the microprocessor.
System log 75% full	Clear the current logs.
System log cleared	Information only.
System Memory Error	<ol style="list-style-type: none"> 1. Reseat the DIMMs. 2. Replace the DIMMs.
System over recommended voltage for +12V	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System over recommended voltage on +2.5V	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System over recommended voltage on continuous +5V	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

System-error log message	Action
System shut off due to system board under temperature	<ol style="list-style-type: none"> 1. Make sure that the fans have good airflow and are not obstructed. 2. (Trained service technician only) Replace the system board.
System shutoff due to +12V over voltage	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System shutoff due to +12V under voltage	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System shutoff due to +2.5V over voltage	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System shutoff due to +2.5V under voltage	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System shutoff due to +3.3V over voltage	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System shutoff due to +3.3V under voltage	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System shutoff due to 1.5V CPU over voltage	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System shutoff due to 1.5V CPU under voltage	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

System-error log message	Action
System shutoff due to board over temperature	<ol style="list-style-type: none"> 1. Make sure that all fans have good airflow and are not obstructed. 2. (Trained service technician only) Replace the system board.
System shutoff due to continuous +5V over voltage	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System shutoff due to continuous +5V under voltage	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System shutoff due to CPU over temperature	<ol style="list-style-type: none"> 1. Make sure that the fan sink has good airflow and is not obstructed. 2. Reseat the following components: <ol style="list-style-type: none"> a. Fan sink cable b. (Trained service technician only) Fan sink
System shutoff due to VRM over voltage	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
System shutoff due to VRM under voltage	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
System under recommended voltage for +12V	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System under recommended voltage on +2.5V	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.
System under recommended voltage on continuous +5V	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap power supplies, if any are installed b. Power supply cables on the system board 2. (Trained service technician only) Replace the system board.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, ThinkServer TS100 Machine Types 6431, 6432, 6433, and 6434,” on page 37 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

System-error log message	Action
We started a RS485 connection with remote system x	Information only.
We will retry sending alert ID x; when accepted by a remote system, it will have a different ID	Information only.
Windows blue screen has been captured	Information only.

Solving SAS problems

For any SAS error message, one or more of the following devices might be causing the problem:

- A failing SAS device (adapter, drive, or controller)
- An incorrect SAS termination jumper setting
- A missing or incorrectly installed SAS terminator
- A defective SAS terminator
- An incorrectly installed cable
- A defective cable

For any SAS error message, follow these suggested actions in the order in which they are listed until the problem is solved:

1. Make sure that external SAS devices are turned on before you turn on the server.
2. Make sure that the cables for all external SAS devices are connected correctly.
3. If an external SAS device is attached, make sure that the external SAS termination is set to automatic.
4. Make sure that the last device in each SAS chain is terminated correctly.
5. Make sure that the SAS devices are configured correctly.

Solving power problems

Power problems can be difficult to solve. For example, a short circuit can exist anywhere on any of the power distribution buses. Usually, a short circuit will cause the power subsystem to shut down because of an overcurrent condition. To diagnose a power problem, use the following general procedure:

1. Turn off the server and disconnect all ac power cords.
2. Check for loose cables in the power subsystem. Also check for short circuits, for example, if a loose screw is causing a short circuit on a circuit board.
3. Remove the adapters and disconnect the cables and power cords to all internal and external devices until the server is at the minimum configuration that is required for the server to start (see “Solving undetermined problems” on page 245 for the minimum configuration).
4. Reconnect all ac power cords and turn on the server. If the server starts successfully, replace the adapters and devices one at a time until the problem is isolated.

If the server does not start from the minimum configuration, replace the components in the minimum configuration one at a time until the problem is isolated.

Solving Ethernet controller problems

The method that you use to test the Ethernet controller depends on which operating system you are using. See the operating-system documentation for information about Ethernet controllers, and see the Ethernet controller device-driver readme file.

Try the following procedures:

- Make sure that the correct device drivers, which come with the server are installed and that they are at the latest level.
- Make sure that the Ethernet cable is installed correctly.
 - The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
 - If you set the Ethernet controller to operate at 100 Mbps, you must use Category 5 cabling.
 - If you directly connect two servers (without a hub), or if you are not using a hub with X ports, use a crossover cable. To determine whether a hub has an X port, check the port label. If the label contains an X, the hub has an X port.
- Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller LEDs on the rear panel of the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.
 - The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
 - The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity light is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check the LAN activity LED on the rear of the server. The LAN activity LED is lit when data is active on the Ethernet network. If the LAN activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check for operating-system-specific causes of the problem.
- Make sure that the device drivers on the client and server are using the same protocol.

If the Ethernet controller still cannot connect to the network but the hardware appears to be working, the network administrator must investigate other possible causes of the error.

Solving undetermined problems

If the diagnostic tests did not diagnose the failure or if the server is inoperative, use the information in this section.

If you suspect that a software problem is causing failures (continuous or intermittent), see “Software problems” on page 158.

Damaged data in CMOS memory or damaged BIOS code can cause undetermined problems. To reset the CMOS data, use the clear CMOS jumper (JP2) to clear the CMOS memory; see “System board jumpers” on page 14. If you suspect that the BIOS code is damaged, see “Updating (flash-update) the BIOS code on the server” on page 232.

Check the LEDs on all the power supplies. If the LEDs indicate that the power supplies are working correctly, complete the following steps:

1. Turn off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices, one at a time, until you find the failure. Turn on the server and reconfigure it each time.
 - Any external devices.
 - Surge-suppressor device (on the server).
 - Modem, printer, mouse, and non-Lenovo devices.
 - Each adapter.
 - Hard disk drives.
 - Memory modules. The minimum configuration requirement is one 512 MB DIMM on the system board.
 - Service processor.

The following minimum configuration is required for the server to start:

- One microprocessor
 - One 512 MB DIMM on the system board
 - One power supply
 - Power cord
 - Power backplane
 - System board
4. Turn on the server. If the problem remains, suspect the following components in the following order:
 - a. System board
 - b. Memory module
 - c. Microprocessor
 - d. SAS/SATA controller

If the problem is solved when you remove an adapter from the server but the problem recurs when you reinstall the same adapter, suspect the adapter; if the problem recurs when you replace the adapter with a different one, suspect the system board or SAS/SATA controller.

If you suspect a networking problem and the server passes all the system tests, suspect a network cabling problem that is external to the server.

Problem determination tips

Because of the variety of hardware and software combinations that you can encounter, use the following information to assist you in problem determination. If possible, have this information available when you request assistance from Lenovo:

- Machine type and model
- Microprocessor and hard disk drive upgrades
- Failure symptoms
 - Does the server fail the diagnostic tests? If so, what are the error codes?
 - What occurs? When? Where?
 - Does the failure occur on a single server or on multiple servers?
 - Is the failure repeatable?
 - Has this configuration ever worked?
 - What changes, if any, were made before the configuration failed?
 - Is this the original reported failure, or has this failure been reported before?
- Diagnostic program type and version level
- Hardware configuration (print screen of the system summary)
- BIOS code level
- Operating-system type and version level

You can solve some problems by comparing the configuration and software setups between working and nonworking servers. When you compare servers to each other for diagnostic purposes, consider them identical only if all the following factors are exactly the same in all the servers:

- Machine type and model
- BIOS level
- Adapters and attachments, in the same locations
- Address jumpers, terminators, and cabling
- Software versions and levels
- Memory amount, type and configuration
- Diagnostic program type and version level
- Configuration option settings
- Operating-system control-file setup

See Appendix A, “Getting help and technical assistance,” on page 247 for information about calling Lenovo for service.

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you. This section contains information about where to go for additional information about Lenovo and Lenovo products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system.
- Go to the Lenovo Support Web site at <http://www.lenovo.com/support> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the documentation that is provided with your Lenovo product. The documentation that comes with Lenovo systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Using the documentation

Information about your Lenovo system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. Most of the documentation for your server is on the *ThinkServer Documentation DVD* provided with your server. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. Lenovo maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.lenovo.com/support> and follow the instructions.

Getting help and information from the World Wide Web

On the World Wide Web, the Lenovo Web site has up-to-date information about Lenovo systems, optional devices, services, and support. For general information about Lenovo products or to purchase Lenovo products, go to <http://www.lenovo.com>. For support on Lenovo products, go to <http://www.lenovo.com/support>.

Calling for service

During the warranty period, you can get help and information by telephone through the Customer Support Center.

These services are available during the warranty period:

- **Problem determination** - Trained personnel are available to assist you with determining a hardware problem and deciding what action is necessary to fix the problem.
- **Hardware repair** - If the problem is caused by hardware under warranty, trained service personnel are available to provide the applicable level of service.
- **Engineering Change management** - There might be changes that are required after a product has been sold. Lenovo or your reseller will make selected Engineering Changes (ECs) available that apply to your hardware.

These items are not covered by the warranty:

- Replacement or use of parts not manufactured for or by Lenovo or non-warranted Lenovo parts
- Identification of software problem sources
- Configuration of BIOS as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of application programs

Refer to the safety and warranty information that is provided with your computer for a complete explanation of warranty terms. You must retain your proof of purchase to obtain warranty service.

For a list of service and support phone numbers for your country or region, go to <http://www.lenovo.com/support> and click **Support phone list** or refer to the safety and warranty information provided with your computer.

Note: Phone numbers are subject to change without notice. If the number for your country or region is not provided, contact your Lenovo reseller or Lenovo marketing representative.

If possible, be at your computer when you call. Have the following information available:

- Machine type and model
- Serial numbers of our hardware products
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information

Using other services

If you travel with a Lenovo notebook computer or relocate your computer to a country where your desktop, notebook, or server machine type is sold, your computer might be eligible for International Warranty Service, which automatically entitles you to obtain warranty service throughout the warranty period. Service will be performed by service providers authorized to perform warranty service.

Service methods and procedures vary by country, and some services might not be available in all countries. International Warranty Service is delivered through the method of service (such as depot, carry-in, or on-site service) that is provided in the servicing country. Service centers in certain countries might not be able to service all models of a particular machine type. In some countries, fees and restrictions might apply at the time of service.

To determine whether your computer is eligible for International Warranty Service and to view a list of the countries where service is available, go to <http://www.lenovo.com/support>, click **Warranty**, and follow the instructions on the screen.

For technical assistance with the installation of, or questions related to, Service Packs for your preinstalled Microsoft® Windows® product, refer to the Microsoft Product Support Services Web site at <http://www.support.microsoft.com/directory/>, or you can contact the Customer Support Center. Some fees might apply.

Purchasing additional services

During and after the warranty period, you can purchase additional services, such as support for hardware, operating systems, and application programs; network setup and configuration; upgraded or extended hardware repair services; and custom installations. Service availability and service name might vary by country or region. For more information about these services, go to the Lenovo Web site at <http://www.lenovo.com/>.

Lenovo Taiwan product service

台灣 Lenovo 產品服務資訊如下： 荷蘭商思惟個人電腦產品股份有限公司台灣分公司 台北市信義區信義路五段七號十九樓之一 服務電話: 0800-000-700

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When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

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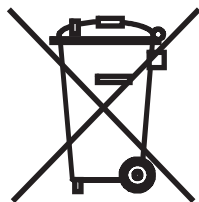
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この機器には、EU 諸国に対する廃電気電子機器指令 2002/96/EC(WEEE) のラベルが貼られています。この指令は、EU 諸国に適用する使用済み機器の回収とリサイクルの骨子を定めています。このラベルは、使用済みになった時に指令に従って適正な処理をする必要があることを知らせるために種々の製品に貼られています。

Remarque : Cette marque s'applique uniquement aux pays de l'Union Européenne et à la Norvège.

L'étiquette du système respecte la Directive européenne 2002/96/EC en matière de Déchets des Equipements Electriques et Electroniques (DEEE), qui détermine les dispositions de retour et de recyclage applicables aux systèmes utilisés à travers l'Union européenne. Conformément à la directive, ladite étiquette précise que le produit sur lequel elle est apposée ne doit pas être jeté mais être récupéré en fin de vie.

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local Lenovo representative.

Battery return program

This product may contain a lithium or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal or batteries outside the United States, go to <http://www.lenovo.com/lenovo/environment> or contact your local waste disposal facility.

For Taiwan: Please recycle batteries.



For the European Union:

Notice: This mark applies only to countries within the European Union (EU).

Batteries or packaging for batteries are labeled in accordance with European Directive 2006/66/EC concerning batteries and accumulators and waste batteries and accumulators. The Directive determines the framework for the return and recycling of used batteries and accumulators as applicable throughout the European Union. This label is applied to various batteries to indicate that the battery is not to be thrown away, but rather reclaimed upon end of life per this Directive.

Les batteries ou emballages pour batteries sont étiquetés conformément aux directives européennes 2006/66/EC, norme relative aux batteries et accumulateurs en usage et aux batteries et accumulateurs usés. Les directives déterminent la marche à suivre en vigueur dans l'Union Européenne pour le retour et le recyclage des batteries et accumulateurs usés. Cette étiquette est appliquée sur diverses batteries pour indiquer que la batterie ne doit pas être mise au rebut mais plutôt récupérée en fin de cycle de vie selon cette norme.

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury, and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and treatment of batteries and accumulators. Customer participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, go to <http://www.lenovo.com/lenovo/environment>.

For California:

Perchlorate material - special handling may apply. See <http://www.dtsc.ca.gov/hazardouswaste/perchlorate/>.

The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials. This product/part may include a lithium manganese dioxide battery which contains a perchlorate substance.

Electronic emissions notices

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Lenovo is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

United Kingdom telecommunications safety requirement

Notice to Customers

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Lenovo cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-Lenovo option cards

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

German Class A compliance statement

Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der Lenovo empfohlene Kabel angeschlossen werden. Lenovo übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der Lenovo verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der Lenovo gesteckt/eingebaut werden.

Deutschland:

Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Betriebsmitteln

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln" EMVG (früher "Gesetz über die elektromagnetische Verträglichkeit von Geräten"). Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EG Richtlinie 2004/108/EC (früher 89/336/EWG), für Geräte der Klasse A.

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraf 5 des EMVG ist die Lenovo (Deutschland) GmbH, Gropiusplatz 10, D-70563 Stuttgart.

Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

Nach der EN 55022: "Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen."

Nach dem EMVG: "Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind." (Auszug aus dem EMVG, Paragraph 3, Abs. 4). Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Anmerkung: Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den Handbüchern angegeben, zu installieren und zu betreiben.

Japanese Voluntary Control Council for Interference (VCCI) statement

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Taiwanese Class A warning statement

警告使用者：
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

Chinese Class A warning statement

声 明

此为 A 级产品，在生活环境中，
该产品可能会造成无线电干扰。
在这种情况下，可能需要用户对其
干扰采取切实可行的措施。

Korean Class A warning statement

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자
또는 사용자는 이점을 주의하시기 바라며, 만약 잘못 판매 또는
구입하였을 때에는 가정용으로 교환하시기 바랍니다.

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